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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXVII. No. 3191.] LONDON, JULY 9, 1924. [76TH YEAR. PRICE 1s.

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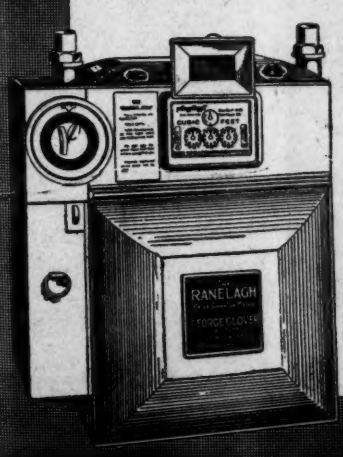

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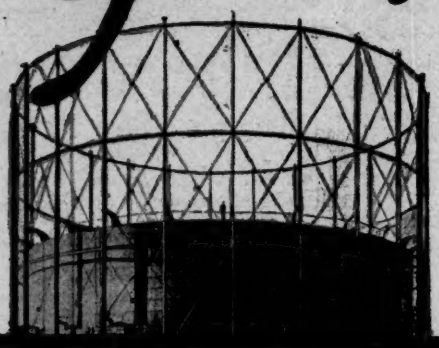

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VOL. CLXVII., No. 3191.] WEDNESDAY, JULY 9, 1924. [76TH YEAR.

EDITORIAL NOTES.

The Power Conference.

THERE were sittings throughout last week, and again at the beginning of this week, of the first World Power Conference at Wembley. From the point of view of attendance of representatives from thirty-nine different countries, the conference has been a great success; or if measured by the number of papers and the extent of the discussions, then there has been success in that respect. But neither the one nor the other is the real desired success. The principal object of the conference, we are told, is the encouragement of co-operation between the nations in efforts which must benefit mankind. Another object should be (and must be, if we are to make the most of our native resources) co-operation between the industries of each country. Unless this results, then the practical issues of the conference will fall far short of what they should be. Perhaps there is no section of the whole conference which demonstrates better than the Gas and Fuel Section (which sat last Monday) how essential is the inter-industrial treatment of the power problem. In its consideration in this country, the relation of the provision of power to the supply of other requisites for industrial use has hitherto been largely overlooked, and so have the economic relations of one industry to another in respect of the single question of the supply of power—whether (at present) by the burning of raw coal for steam-raising, the use of electricity, or the use of heavy oils. It is one of the most difficult things to break through this industrial insularity, and make the responsible men see in the broadest sense the position as it actually exists economically. If the papers before the Gas and Fuel Section be taken together, the inter-relationship of these things will readily be seen. For the economic advancement of our country, there must be no monopoly in power; and there can be no universal form of producing it. If there is, we shall not realize the last fraction of economy and efficiency from our national resources, nor the ultimate benefit for industry and for the community at large. To day we commence the publication of the main parts of two of the papers having the most immediate interest for our readers.

Building Good Reputation.

IN the gas industry there is a preponderating view that the British Empire Exhibition will have results for gas undertakings of an eminently satisfactory order; but in respect of other industries that is not the universal belief. The world has its optimists and its pessimists everywhere; and it would be a strange—in fact, almost an uncanny—thing if it were found that all people were of one mind about the potential effects of an exhibition. Now of a certainty we know one thing the Exhibition has done. It has made people talk; and it has made people all over the world desire to see it. Though millions have been, and millions are coming during the next full three months, the total will only represent a fraction of those who would like to ramble through the vast buildings and take stock of the demonstrated industrial and commercial power of the British Empire. The Gas Industry's Exhibit has had a large share of attention and an amount of praise from all parts of the country that has exceeded (as the news paragraphist would express it) "our most sanguine expectations." But, speaking of the Exhibition generally, there are some people who are optimistic as to the direct and indirect results; there are facing them people who are doubtful as to one or the other, or of both. The latter are among those who do not assess on a proper scale the importance of advertisement and demonstration as constituents of industrial and commercial enterprise. We believe that for all industries the direct and the indirect results will be good. There is one aspect of the indirect results which has not been sufficiently brought to notice. It is that the Exhibition will—it must—inevitably raise the standard of reputation. And reputation goes a long way in the production of successful trading issues. In the gas industry there is, as in the electrical and other industries, room for levelling-up reputation. Reputation is largely born of the experiences of people whose good opinion is worth having, if we are to reach a uniformly high plane of success; and experiences of gas use, as of the use of other agents performing similar duties, are diverse, owing (where the experience is not of the best) to the want of knowledge or to the indifference of suppliers to the policy of good service among the consumers.

What, for instance, does the Gas Exhibit prove? It is proving to countless people that gas can be applied to many purposes in the home and in industry in a highly efficient manner, and is an agent which promotes, where efficiently applied, considerable economy. When people see what is done in the Gas Exhibit, and so can be accomplished elsewhere, this must have the effect of raising the reputation of gas, and of engendering the desire to secure equally good conditions in application, in the home, factory, or elsewhere. If only 160,000 people in the whole of the British Isles are impressed in this way by the Gas Exhibit, without counting those from overseas, the expenditure on the six months' display and on all the associated propaganda and publicity work would not more than equal 10s. per head. And the 160,000 people would be potential advertisers. We are not so foolish as to limit impression to that number; it is only a figure adopted for illustration purposes. We are, however, convinced from observation, from report, from conversation with laymen, that the capability of the gas industry for good service is day by day winning new ground through the Gas Exhibit; and this means the growth of reputation. The same applies to other industries; and whatever their gain, the gas industry will share in it, standing as it does in relation to them as a universal provider of light, heat, and power, and essential products. We have no fear that this exhibition which is so majestic, so magnetic, so appealing, will not raise the reputation collectively and individually of all who are taking part in it. The result may be indefinable in terms, but it will be magnificent. That is our belief.

M. Rouland and International Development of Technical Work.

SINCE the publication of our Institution number, there has been time to reflect over our representative's light but vivid and detailed account of the doings and impressions of those fortunate ones who were able to visit Paris at the close of the Institution meeting to take part in the celebrations of the Centenary of gas supply in France and the Jubilee of the Société Technique du Gaz. Those who have not had an opportunity of reading the narrative, owing to the mass of other matter presented to them last week, will find it on pp. 183-192 of the Institution issue. When our friends across the Channel have occasion to celebrate or commemorate, they enter into it heart and soul; when they are filling the rôle of hosts, their exuberance and generosity reach

supreme heights. This occasion was no exception to the traditional rule. Those among us who have experienced the delights of visiting our colleagues in France in years past know that with them the traits of sincerity, vivacity, and right good fellowship and hospitality are not only traditional but innate. While their visitors rejoice with them, they with their large-heartedness rejoice over the coming of their guests. On the outward journey on such occasions, one always feels honoured at having been the recipient of an invitation to participate in the functions of our friends across the water; but one starts the return journey with the feeling that in some indefinable way, but still existent, our French friends have endeavoured to supplant that view by the one that the acceptance of the invitation and the presence of their guests have conferred honour upon them. This was manifestly so on the present occasion. And those few days crowded with delight, good fellowship, congratulations on the past and present, and for the future wishes of the highest order, will remain for the lifetime of all participants priceless memories.

But it should not—we almost wrote "must not"—stay at that. The relations of the French and British gas industries are good. There are bonds between them which cannot be severed; and the question is whether it is not possible to have a still closer union in beneficial work of the professional gas men of the two countries. The time is opportune. The gas industry in every country is in a state of transition—transition from an old order of service to a new and larger service in the domestic and industrial realms, and from an old order of (what we now know to have been) manufacturing inefficiency and uneconomy to a degree of efficiency and economy which at one time within the experience of not many years since was thought impossible. M. Rouland, the distinguished President of the Centenary Committee and of the Société Technique (now the immediate Past-President of that body) has revived an idea—an idea to which he has previously on occasion given expression; it is the idea of an expansion of co-operation. Co-operation in technical work need not be indigenous; it can be international. Almost towards the close of the recent functions, in which as many visitors from the British Isles took part as there are years in the history of gas supply in France, M. Rouland said: "May these days of joint work now nearly over lead to a "decisive step towards an old idea to which I hold more "and more—the permanent international co-operation of "our professional organizations." There is seed in those words which we hope will germinate, grow, and flourish. We see no reason why it should not do so. The then President of the Institution (Mr. Samuel Tagg), in his speech at the banquet in Paris—not expressly perhaps, but still the thought was there—showed that a greater union was not beyond the pale of practical politics; and the presence of Mr. Thomas Goulden and Mr. A. E. Broadberry (as delegates from the Institution) throughout the proceedings at the meeting of the Société Technique du Gaz, accentuates the opening lines of possible preliminary co-operative work. What Mr. Tagg said was: "With the restoration of order "and liberty in France, the industry has made rapid strides; "but to reach the objective we all desire, and for which we "are all striving—that is, to extend yet further the applica-"tions of gas—the attention of the general public must be "drawn with insistence and devotion. Your efforts in this "direction will meet with well-deserved success. *We shall "facilitate this progress by the intimate relations of engineers of "both countries; and for this reason we welcome your visits to "Britain, and eagerly seize the opportunity afforded to recipro-"cate these visits.*"

As a first step towards this greater co-operation between the gas engineers of France and Britain, why should not it become a normal thing for delegates from the Société Technique du Gaz to be present at the annual meetings of the Institution, and delegates from the Institution to be present at the meeting of the Société, for the purpose, if desired, of taking part in the technical proceedings, and of presenting to their respective organizations reports and comments on the work done? We will not attempt to forecast collaboration developments upon such an initial step. That there would be developments we have no doubt; that such an initial step would have in it mutual inspiration and advantage, is a certainty. Will Mr. J. Ferguson Bell, the successor of Mr. Tagg in the Presidential Chair of the Institution, pursue the revived idea of M. Rouland? The cordiality of the letters Mr. Ferguson Bell has addressed to France (and which we are privileged to reproduce elsewhere to-day) seem to indicate a *rapprochement* between his ideas and those of M. Rouland.

The Status of Gas Coke.

It stands to the credit of the good sense of the gas industry that, at a time when the market for coke is excellent—when prices are high and the demand is, generally speaking, equal to supply—that a considerable amount of attention is being devoted to the question of improving its quality, so as to make it a still more acceptable fuel. Coke from the qualitative point of view has hitherto been much neglected; and yet its importance as a revenue producing commodity, which assists so largely to reduce the net cost of the primary product of gas undertakings, ought to have saved it from such neglect. At the meeting of the Institution, the President (Mr. Samuel Tagg) gave prominence to its importance in this respect; and he also referred to the work that has been, and is still, proceeding to expand its markets by improving its physical properties. There may be some question as to why this is necessary, when the supply is only about equal to the demand. Those who ask this question have not given sufficient reflection to the position. Quality in this case stands for stability; stability is secured by extending the suitability of coke for new applications. It is better not to speculate upon the future; there is wisdom in making preparation for any changes that may come about through an alteration in the current economic state. The man with two strings to his bow is safer than the man with only one. Nor can we stake the interests of the gas industry upon complete carbonization being the gas-manufacturing process of the future. Given a coke market abundantly good for the available supply, complete carbonization might not be financially all it appears to be when regarded solely in terms of gaseous therms.

The present healthy position of the gas-coke market, as Mr. Tagg pointed out, is attributable mainly to three things: (1) To the increased use of coke for steam-raising and other industrial purposes; and to the reduction of the amount available for home use by (2) water-gas making and the steaming of charges in vertical retorts, and (3) the tremendous flight the export of coke has made the last year or two. Those who question the necessity for troubling about quality with the present level of demand should consider the possibilities that may materialize—we do not say will—from the efforts now being made to establish in industry a greater field of use for low-grade and pulverized fuels. We have got to do all we can to keep our gains in the industrial market. Mr. E. W. L. Nicol, in his paper before the Gas and Fuel Section of the First World Power Conference, has given ample evidence as to the national importance of the industrial use of coke, and of the importance to industry through the higher duty realized by its use for steam-raising. The paper is extracted in this issue, so that readers can see for themselves the related facts. Then as to the large growth of the export trade in gas coke. Last year it had ascended to 1¼ million tons, compared with 911,307 tons in 1922, and only 443,565 tons in 1921. But such rapid flights as these in business, at the prices that have been commanded, are not permanently reliable. They are oftentimes due—at any rate in part—to temporary causes. Already in the first five months of this year, we see the exports of gas coke were 408,092 tons, or 38,679 tons less than in the first five months of 1923. With the progress of continental conditions to a more normal state, the European markets for British-produced gas coke may not be nearly so favourable. No one can at present tell. Prudence therefore points to the making of coke more serviceable by improving the quality for the home domestic market, while maintaining and increasing the absorptive capacity of the industrial market by the same means. It is questionable whether low-temperature carbonization will be able commercially to compete with high-temperature gas coke of such physical characteristics that combustibility is enhanced in comparison with the present qualities of coke. Mr. E. V. Evans brought this matter prominently to notice in his Cantor Lectures. The work of Sutcliffe and Evans, of Illingworth, the Fuel Research Board, and others in this connection is well known to readers of the "Journal." Also the importance of the production of a moisture-free coke was emphasized in the paper which Mr. R. E. Gibson read at the meeting of the Institution, as published in last week's issue. In connection with this, it may be pointed out that,

while there is legitimate complaint on the part of many gas men of incombustibles in coal, some of them should remember that water in coke does not assist the buyer to obtain the highest heat efficiencies.

We are not pessimistic as to the future of the coke market; but we have a strong belief in increasing the stability of business in any commodity by enlarging the scope of demand. In the case of gas coke, this is to be done by improving its quality, and thus applicability. Therefore, it is hoped that the work having this objective will proceed, and as vigorously as possible.

Sulphate Manufacture and Effluent Liquors.

THE annual report of the Chief Inspectors under the Alkali Works Regulation Act—Dr. T. Lewis Bailey for England and Wales, and Mr. J. W. Young for Scotland—has been issued. Again, the authors have given us a valuable document, which supplies not only information as to the official work of the year 1923, but supplementary particulars of the research into the treatment of effluent liquors from the distillation of ammoniacal liquor. We are pleased to have from Dr. Bailey a fairly clean sheet regarding the good conduct of sulphate of ammonia and ammoniacal liquor works. Generally speaking, they gave no offence; but it is obvious that there are isolated cases where managers should pay greater attention to the purification part of the process. The Eastern Midlands especially appear to have fallen into disgrace in this matter, inasmuch as it is reported that there the purifiers have been allowed to get into poor order—either capacity has been insufficient, or, where walled purifiers are employed, the joints in the brickwork were found leaking. Such things only happen through negligence; and it is not a testimonial to good management that it should be left to an inspector to point out either the deficiency or the leakages. But in most cases, attention having been directed to these matters, larger purifiers have been installed where there was insufficient capacity; and walled purifiers have been converted into heap ones with improved working in both cases. It has been necessary to issue one or two warnings—one of them of a severe nature. We are glad cautions were not necessary in more instances. But Mr. Young in his report on Scotland seems to have had rather greater experience of indifference to good purification conduct. Indeed, in two cases it would have been justifiable to have had recourse to legal process for obtaining the infliction of penalties for the transgressions. Warnings have also been issued in Scotland regarding the more frequent renewal of oxide, and the provision of adequate capacity.

The production of sulphate of ammonia (expressed as sulphate 25¾ p.ct. NH_3) showed in the total a considerable flight upwards in 1923, though there was a recession of some 1837 tons in the output of English and Welsh gas-works. The quantity from all sources in England and Wales was 327,996 tons, which was an increase of 52,695 tons upon the yield for 1922. The production in Scotland was 97,594 tons—an increase upon 1922 of 21,753 tons. Adding together the production of England, Wales, and Scotland, the total was 425,590 tons, or an increase of 74,448 tons upon the preceding year. This shows a remarkable stride in output—more especially in comparison with 1921, in which year England and Wales only produced 188,228 tons, and Scotland 62,343 tons—together 250,571 tons. It should be explained that of the total quantity of ammonia products in England and Wales, the equivalent of 32,780 tons was last year manufactured as concentrated ammoniacal liquor; the balance of 295,216 tons consisting of other ammonia products (sulphate, chloride, nitrate, &c.). In the case of Scotland, 6291 tons of the total were obtained as concentrated liquor ammonia, and 530 tons as ammonium chloride. It has already been mentioned that the production of the English and Welsh gas-works showed a decline of 1837 tons; but the output for the year by gas-works was far in advance of that of 1921, when it was 129,431 tons, or less than 1923 by 13,549 tons. But the striking recovery that has been made by coke-ovens in carbonizing activity is shown by the fact that last year in England and Wales they produced 178,303 tons of sulphate, &c., or 52,624 tons more than in 1922. This increase in the one year is almost equivalent to the total production by the coke-oven plants in 1921—54,184 tons. It shows how three years ago the iron and steel industry had fallen on dark days; and it also indicates the tremendous character of its recovery—unfortunately not entirely in this country, for the last year or more the quantity of metallurgical coke exported has been at a very high level. We are not surprised at the production from gas-works receding somewhat from the figures of 1922, despite the fact that there has been a disposition, on account of the excellent values of coke and the cost of water-gas production, to favour the extension of gas output by a greater carbonization of coal. We are rather inclined to think that the secret of the recession in sulphate production is due to the smaller works, and those not well placed for the disposal of their liquor, finding that costs on the one hand, and market values on the other, have not a reciprocal profitable tendency. In the figures relating to Scotland, it is noticed that the shale works produce in terms of sulphate rather more than double the quantity yielded by the gas-works—the relation being in 1923 24,587 tons for gas-works, as compared with 50,683 tons for the shale plants.

Turning to the research, it will be remembered that Dr. Bailey and his staff have been endeavouring to find an efficient and practicable method of treating the effluent from sulphate of ammonia and gas-liquor plants. This work has been continued, but on somewhat different lines. The dephenolating towers which were erected at the Hornsey Gas-Works have continued to operate well, though it has not been possible, so far, to introduce fans for effecting the passage of the fire gases through the towers, instead of using a steam-injector. But the method will soon be applied at another works. An interesting point is introduced. The horizontal retort liquor at Hornsey has an oxygen absorption figure of about 300 parts per 100,000; but the spent liquors of vertical retort origin have much higher oxygen absorption figures—600 to 800 parts per 100,000. The phenol, thiocyanate, and thiosulphate content is also much higher than in horizontal retort liquors. While it is possible to calculate approximately the oxygen absorption figure from the composition of the liquor, calculation in the case of vertical retort liquors invariably gives considerably lower figures than are obtained by actual experiment. This suggests the presence in the vertical liquors of other oxidizable bodies, which do not volatilize on distillation; and the behaviour as regards colour points to the presence of higher phenoloid bodies—such as di-hydric and tri-hydric phenols. Further, vertical retort effluents have a high content of thiocyanate and thiosulphate, which complicates the question of effluent treatment and disposal. Phenolation treatment of vertical retort liquors is manifestly insufficient; complex biological treatment is of doubtful practicability—at any rate, in the case of gas-works. It is, however, pointed out that fractional separation of the bulk of the tar in the crude gas at the hot end of the system (if it is possible to effect this in the case of vertical retort systems where a dry gas-main exists), as well as separation of the tar and condensed liquor, as far as may be throughout the plant, should effect a notable reduction in the phenol and higher tar-acid content of the liquor. Although known for many years, a point still worth mention is that the greater part of the thiocyanate and thiosulphate present in ammoniacal liquors is due to oxidation changes taking place when air is present. Minimizing air leakage at the retorts, and admitting air at a point immediately before the purifiers, reduces the formation of thiocyanate and thiosulphate. A further point for consideration in this connection is cyanide recovery. The subject is one opening up a large and interesting field; but it is complex, owing to the variations in the content of liquors from different sources.

The report contains data as to the amount of tar products manufactured during 1923. The tar distilled from gas and coke-oven works in England and Wales amounted to 1,436,305 tons; the pitch yield being 578,456 tons. From other works the tar distilled was 20,895 tons, and the pitch produced 9362 tons. In Scotland, the tar distilled was 224,968 tons, and the pitch yield was 89,544 tons. It is found that—suitable plants being now available for even the smaller works—tar distillation is fast extending. This is due to the almost universal demand for dehydrated tar for road purposes, and the high costs of transport. Few difficulties are now met with in the use of plants for first-stage distillation—dehydration and light oil removal. The report does not appear to be so extensive as usual; but the contents are highly interesting.

Wembley.

The six millionth visitor passed through one of the turnstiles last Saturday.

Section 10.

Is there some subterranean influence at work urging the authorities of the House of Lords to make Special Orders subject to further parliamentary procedure, which will increase the costs to the promoters, and put a brake on expedition? The authorities of the House of Lords should range themselves on the side of economy and efficiency; but, in this particular matter, they seem inclined to favour the opposite.

"N.G.C." Membership.

The total number of undertakings subscribing to the funds of the National Gas Council at March 31 last was 838, representing 87 p.ct. of the total make of gas in the United Kingdom.

Flexibility in Horizontal Retort Working.

An article on later pages of this issue describes a new design of horizontal setting for which Messrs. Robert Dempster & Sons, Ltd., of Elland, are responsible. Though the constructional details of the setting are of interest and indicate the remarkable advance made in the construction of horizontals, the outstanding feature lies in the fact that the setting can be fired by coke, producer gas, coal gas, or mixtures; the auxiliary regenerator being designed to meet these variable requirements. Flexibility is the keynote of the design; for it gives the gas engineer a controlling influence on the residual market. If coke sales show signs of weakening, he is enabled without difficulty to pass any setting on to coke firing, and thus, by regulating the supply, to a larger extent to maintain the demand, and consequently the price per ton. The idea of the makers is not to regard coke as the main product of a gas-works, but to produce gaseous therms at the minimum cost; and whatever the individual views of gas engineers may be, we feel sure that the suggestions put forward briefly in the article referred to will be considered with great interest by all.

Illumination and Saving.

In a paper before the World Power Conference, the progress in the efficiency of electric lamps was referred to by Mr. C. W. Sully, of the Electric Lamp Manufacturers' Association. Through the increased efficiency, there has been a remarkable saving. In 1922, England's electric lighting bill, it is said, was about £19,000,000. If the lamps in use twenty years ago had not been improved by continuous research, the amount would have been £72,000,000. The difference of £53,000,000 approximates to the total net income of all the railways of Great Britain. A deduction can be made from these figures. If the efficiency of electric lamps had not been improved, electric lighting would not have made progress to an extent to yield £19,000,000 in 1922. It must not be forgotten, too, that the charge per unit for lighting in 1922 was higher than it was in 1914.

Motor Spirit Duty Rejected.

In the House of Commons the other night, Mr. Gosling, the Minister of Transport, replied to an inquiry for information as to the transfer of the incidence of motor taxation from horse power to petrol or motor spirit. He stated that the report of the Departmental Committee on the taxation of road vehicles will be available shortly. It covers several points; but on the main question of a duty on motor spirit, seven members are against, two in favour, and the remaining member has presented a separate memorandum. The five members who signed the main report, while recommending certain modifications of the existing system of taxation, arrived at the general conclusion that no method of administering a motor spirit duty could be contrived which would not inflict grave inconvenience and additional expense on considerable numbers of consumers of motor spirit, and some of the kerosene used for purposes other than the propulsion of road vehicles, or which can be relied upon to yield a certain revenue at reasonable cost. Two other members of the Committee concur in the main report so far as it concerns motor spirit duty, though they consider that the inquiry has established an even stronger case against it than is set out in the main report.

The Slump in Coal Exports.

The advocates of high wages (irrespective of production costs) and of nationalization always assume that the price of an article can be pushed-up to any level without reducing the total amount received from sales. They fix in their own minds a "living wage," and imagine that by so doing they have repealed economic law. When reminded of export trade and foreign competition, they change the subject, or abuse the capitalist system. The official figures of our coal export trade (noticed last week) must be a shock to those who take the trouble to study them, and may persuade some few of the doctrinaires that there is a flaw in their doctrine. For the first five months of 1923, this country exported 33¼ million tons of coal, at an average price of 25s. per ton, f.o.b. For the corresponding period of 1924, the tonnage exported fell to 26¼ million tons, and the price obtained was 24s. 8d. In the month of May alone, the tonnage fell by over 2 millions, and the price by 3s. 3d. a ton. For the period of five months this means a loss of 9 millions sterling to the industry, the greater part of which would have gone to wages. It would almost appear as if there are some things a Socialist-Labour Government and the new Secretary to the Miners' Federation cannot do—among them to compel the foreigner to buy our coal if he can get other coal cheaper. At the same time Mr. Frank Varley, M.P., the Notts miners' leader, is prophesying that in a few weeks 30,000 miners will be out of work in the poorer districts; and from all parts of the country reports are coming in of pits working short time or closing-down altogether. This is the result of the working of economic laws, and nothing else. Before the Buckmaster inquiry, the miners' leaders complained that the owners were cutting each others' throats in the export trade, and urged that, if they would only combine, the foreigner would be forced to pay higher prices. The answer appears in the above figures, and in the fact that whereas in Great Britain the output per person employed in the mines is 5 tons per week, in America it is about 18 and sometimes as high as 20 tons.

ESTIMATION OF SULPHUR IN COAL.

[From the "Chemical Trade Journal."]

A novel method for the rapid and accurate estimation of the sulphur content of organic substances was described by Dr. H. Bahr, of Clausthal I.H., in a paper read before the general meeting of the Verein Deutscher Chemiker held at Rostock-Warnemünde. So far this method has only been worked out as applicable to coals, but researches with a view to extending its application to organic compounds in general are in course of progress. The method ("Chemiker Zeitung," June 24) is really an application of the Goldschmidt alumino-thermic process, and is carried out according to Dr. Bahr as follows.

An intimate mixture of finely-powdered coal, "aluminium gravel (*aluminiumgriess*)" and barium peroxide, preferably in the proportions 0·5 gramme, 0·4 gramme, and 3 grammes respectively, is made. This mixture is then briquetted (Dr. Bahr does not state how), and the briquette is ignited by means of a bunsen, after having been placed in a quartz crucible provided with a perforated cover. The briquette burns readily with a long pointed flame, but there is no spurting as there would be were the mixture not briquetted. The grey to black melt which results is allowed to cool and on examination distinct small spheroids of metal are visible. At the high temperature of the burning briquette the organic substances of the coal are completely destroyed, and the liberated sulphur combines quantitatively with the metallic barium to form barium sulphide. After cooling, the crucible, together with its lid, is treated with dilute hydrochloric acid, and the hydrogen sulphide evolved converted into cadmium sulphide in a ten-bulb tube; the sulphide being estimated with iodine and thiosulphate in the usual way.

Dr. Bahr states that the whole operation from the briquetting to the final titration can be carried out in 45 minutes, and that its accuracy is equal to that of the Carius method, even with sulphur contents as high as 8 to 9 p.ct. The presence of moisture in the coal does not affect the results. The method has been tried on brown coals, anthracites, and all types of coke. Dr. Bahr also states that in collaboration with Ing. v. d. Heidl at the Clausthal Coal-Chemistry Laboratories, he is endeavouring to work out a similar method for the estimation of nitrogen in coal. This will be of interest to those who know the inaccuracies of the Kjeldahl method.

The Institution of Public Lighting Engineers and Superintendents—Glasgow Conference.—The Corporation of the City of Edinburgh have decided to welcome the members of the Institution to Edinburgh and to entertain them to luncheon in the City Hall on the occasion of their visit there on Thursday, Sept. 18, and to arrange for drives to places of historical interest in that city.

PERSONAL.

Mr. FRANCIS W. J. BELTON, Gas Engineer and Manager to the Macclesfield Corporation Gas Department, has been appointed Gas Engineer to the Christchurch (New Zealand) Gas, Coal, and Coke Company, at a salary of £1150 per annum. The appointment is for a minimum period of three years, and subject thereafter to six months' notice on either side. Mr. Belton, who expects to sail to New Zealand about the middle of August, is 31 years of age, and received his early training as an engineering pupil at Messrs. West's Gas Improvement Co., Ltd., Manchester, and the Manchester College of Technology. While with Messrs. West's he was given charge of the erection and starting-up of complete vertical-retort installations at Newcastle-upon-Tyne, Lytham, and Blackpool. While at Macclesfield he has supervised the installation of water-cooled condensers, ammonia washers, waste-heat boilers on vertical retorts, and an anhydrous ammonia plant. He was the first engineer in the country to instal waste-heat boilers on Glover-West settings. The anhydrous ammonia plant is the only one operating in this country outside London.

Mr. HENRY L. BATEMAN, Deputy Engineer and Manager to the Wakefield Gaslight Company for the past five years, has been appointed to the position of Gas Engineer and Manager to the Dewsbury Corporation. Mr. Bateman, who is 32 years of age, was educated at the Essex County High School, and received his gas engineering training at the works of the Ilford Gas Company, where he was an articled pupil to the Engineer and Manager, Mr. William B. Farquhar. He was afterwards appointed Assistant Engineer and Manager to the Merthyr Tydfil Gas Company and later Assistant Engineer and Manager to the Stretford Gas Company. Mr. Bateman holds a first-class honours certificate in gas engineering, is a member of the Institution of Gas Engineers, a member of the Society of Engineers, and was President of the Yorkshire Junior Gas Association in 1922-23.

Mr. JOHN N. HIGGS, who has been appointed Engineer and Manager of the Swanage Gas and Electricity Company, commenced his career in the industry with his father, Mr. W. Higgs, Engineer and Secretary of the Basingstoke Gas Company. In 1912 he was appointed Assistant to Mr. A. E. Saville, Engineer and Secretary of the Farnham Gas and Electricity Company, Ltd.; and during his tenure of this office numerous extensions were made to the plant at Farnham. In 1914 he was appointed Assistant Engineer and Manager of the Herne Bay Gas and Electricity Company, Ltd., and assisted in the erection of new works there. During the war, Mr. Higgs served with the R.A.S.C. Motor Transport; 3½ years of his service being overseas.

By a majority of two, the wages and salaries increases of Belfast Corporation officials, including that of £500 to Mr. J. D. SMITH, the Gas Engineer, were deferred for a year at the public meeting of the Council on Tuesday of last week, at which the minutes of the Council in Committee came up for confirmation. The total recommended increases would have amounted to almost £28,000.

The Directors of the Croydon Gas Company at their meeting on the 4th inst. elected Mr. HAROLD WILLIAMS, O.B.E., F.S.I., to the vacancy on the Board occasioned by the death of Mr. Samuel Spencer.

Mr. G. E. WHITEHOUSE, who for the past twenty-seven years has been the Birmingham representative of Messrs. Settle, Speakman & Co., Ltd., has just retired, and carries with him the best wishes of a wide circle of friends.—Mr. S. H. HOTCHKISS, who is very well known in all branches of the trade in the Birmingham area, has been appointed to succeed him in the management of the Birmingham office. He hopes to keep in touch with all his friends in various parts of the country, and to continue his old business connections.

At the annual congregation in St. George's Hall of the University of Liverpool, held on Saturday, July 5, for the conferring of degrees, Miss MARIAN GRAY, who passed Part I. of the B.A. English Literature Honours Course, was awarded the Edward Rathbone prize, the premier distinction in that subject. Miss Gray entered the University in 1922 on securing a Lancashire County Major Scholarship tenable for three years at any Northern University. She is the only daughter of Mr. J. Alex. Gray, Gas Engineer and Manager to the Ashton-in-Makerfield District Council.

OBITUARY.

W. A. SAPEY.

Throughout the gas industry, and in the Midlands especially, deep regret is felt at the loss sustained through the death of Mr. W. A. Sapey, late Engineer and Secretary of the Tamworth Gaslight and Coke Company, which occurred last Wednesday. All who came in contact with Mr. Sapey experienced that rare but happy feeling towards him—a combination of respect and real affection. His cheerful temperament, his capacity for looking on the bright side of things, and his charming personality engendered in all an appreciation of his warm human sympathy and encouraging influence; and in Tamworth, where his professional and social activities brought him in close touch with most of the citizens, his good cheer and his great willingness to help others will be sorely missed.

Mr. Sapey was appointed Secretary to the Tamworth Gaslight and Coke Company in 1892, and early in the following year was appointed to the dual office of Engineer and Secretary. He was also Secretary of the Fazeley Gas Company, and Consulting Engineer to the Coleshill Gas Company. Mr. Sapey was a staunch Freemason. He was a Past Master of the Marmion Lodge, Tamworth, and a Past Provincial Director of Ceremonies in the Province of Staffordshire. The funeral took place at Tamworth last Saturday afternoon.

It is with great regret that we notice the death of RICHARD COUNSELL HODGES, a son of Mr. R. J. Hodges (the well-known steam-turbine manufacturer, of Southall), which occurred last Thursday as the result of a motor cycle accident when he was on his way to the works. Mr. Hodges was 23 years of age, and had a distinguished career at the London Polytechnic School of Science. He was the second and only surviving son of Mr. Hodges, his other son having been killed in an accident 11 years ago. We tender our deepest sympathy to Mr. Hodges and his family in their loss.

It is with deep regret that we announce the death of Mr. F. W. OLDFIELD, M.I.Mech.E., late Engineer and Manager of the Chester-le-Street Gas-Works; and general sympathy will be extended to his widow and son. Mr. Oldfield commenced his career with Sir Alfred Gelder, of Hull, and completed his articles with Messrs. R. & J. Dempster, of Manchester. After leaving the latter firm he was for some time Assistant Engineer to the East Hull Gas Company, following which he occupied a similar position with the Ilford and Barking Gas Company. He was then appointed Engineer and Manager of the Beverley Corporation gas and water undertaking, which position he held until about three years ago, when he joined the Chester-le-Street Gas Company.

ELECTRICITY SUPPLY MEMORANDA.

THE annual Convention of the Incorporated Municipal Electrical Association has been held in the historic city of Chester; and the members were treated to an address by the President (Mr. S. E. Britton, the City Electrical Engineer), in which it is suggested that all the general legislation of the electricity supply industry is wrong—even the 1919 Act, which was intended to be a new charter for it. The ideals of those days have been largely blotted out by time and commonsense. Mr. Britton is so depressed over the legislative position and the effects that he says "it is doubtful whether there exists a single person engaged in the work of electricity supply who regards the latest attempts to remove the obstacles we have had to confront in the past, as likely to be successful in facilitating development, or in bringing the industry to that position of importance which is presumed by the optimistic to be the result of Government intervention in the industries, businesses, and homes of the nation." One way in which the Acts should be amended is that they should make it obligatory for the electricity authorities to extend their cables throughout the economical area of supply of each undertaking. The obligation to supply ought to be undertaken without reference to any local authority boundary. The President also levelled some hearty blows at the development under the 1919 Act which gives, not only authorized undertakers, but county councils, local authorities, railway companies, large consumers, and other associations or bodies within the district, representation on the Joint Authorities. It is all fundamentally wrong. These redundant authorities have the right of participation for various purposes. They are a sort of protecting leaven in the administration. But Mr. Britton regards them as positive obstacles to the realization of the goal. He holds that the needs of the country for abundant electricity supply will not be met as expeditiously as they should be until these superfluous local authorities, associations, and individuals are denied any part in the administration of the Acts. The effect of bringing in this "welter" of local authorities, railway companies, and individuals has, it is asserted, introduced into the electricity business a number of people who are not competent to form an opinion on the need of a general supply, or on the other problems with which the actual electricity suppliers are vitally concerned. It is through the introduction of these incompatibles that proper coherence is unobtainable in the Joint Authorities. When the interests of the constituents of an administrative body are totally dissimilar, there cannot be a good weld; and there is bound to be trouble. It seems to us that what Mr. Britton is after is to strip the industry of its past legislation, start *de novo*, and set-up something which will meet his views. He blames the system of local government for a lot of the difficulties of public utility undertakings—the "system" comprising councils in counties, boroughs, urban districts, rural districts, and parishes. This is not only unsatisfactory, but it impedes the progress of all public utility undertakings (among which Mr. Britton generously includes gas), and retards the development of the resources of the country and the prosperity which should arise therefrom. The whole system of local government, Mr. Britton considers, should be reviewed in order to ascertain whether it cannot be improved as demanded by modern conditions; and steps should also be taken to facilitate the supply of electricity into rural districts from existing undertakings. In these matters, Mr. Britton seems to reflect the views of many other men in the electricity supply industry.

Legislative Iniquities.

The Company Nucleus of Centralization.

The great purpose of the existence of the Electricity Commissioners is to bring about the concentration of electricity generation in extensive areas, and to do this without fear or favour, irrespective of municipal or private ownership. Owing to their superior geographical and statutory positions compared with municipal undertakings, the power companies have been doing very well lately—through the discretion, wisdom, or otherwise of the Electricity Commissioners—in picking-up additional loads in the way of bulk supplies to existing supply undertakings. The Electricity Commissioners prefer this course in many cases to the sanctioning of loans for the extension of purely local stations. This being so, there has been open rebellion against the Commissioners on the part of individual municipalities. Now the matter has been before the Incorporated Municipal Electrical Association, and a resolution has been passed—not that resolutions will have much persuasive influence with the Commissioners, seeing that their decisions have naturally been based upon what they conceive to be their duty under the statutory powers conferred upon them. The resolution was proposed by Mr. Councillor Sutcliffe, of Halifax. The terms were altered somewhat, after discussion; but, as passed, it recorded that the Association views with grave concern the tendency to transfer the generation of electricity from municipal authorities to power companies. It also embodied the "considered opinion" that the powers held by these companies should not be permitted to restrict the development of municipal undertakings, where the municipality are prepared to furnish adequate supplies at reasonable prices. Power of appeal from the decisions of the Commissioners was also desired. It is obvious that the municipal authorities are not pleased with the trend of things. The power companies, or some of them, had an almost dormant existence for about twenty years. But the Act of 1919 gave them their opportunity; and stimulated by prior experiences, they have not been slow to take it. The municipalities are finding the power companies hemming them in on every side. If they desire to make an extension of area, they find their very gates blocked by the companies. It frequently happens, too, that if municipal bodies desire to carry-out a scheme of plant enlargement, they sometimes learn that the Commissioners are of opinion that it will be to the general interest to allow the companies to generate, and to supply in bulk. But at the meeting of the Municipal Association, it was pointed out that this sort of thing had become so pronounced as to cause local authorities serious alarm. Burnley was instanced. The Corporation proposed to erect a new generating station near the borough; and the Lancashire Electric Power Company offered to do the same. The Advisory Board for the Mid-Lancashire district were (with the exception of the Railway and the Power Company's representatives) unanimous in recommending that the Corporation application should be acceded to. Notwithstanding, the Commissioners authorized the Company to erect the station. The Burnley Corporation feel this very keenly, as they claim to have successfully generated electricity since 1893. It was considered by one speaker that the Commissioners were paying more attention to the rights and privileges of the Companies than of the municipal authorities; but this is tantamount to accusing the Commissioners of bias and prejudice. Whether Sir John Snell and his colleagues will take notice of these reproaches from the municipal authorities, we do not know, but we have our doubts. It would be a course that is not usual on the part of a Government Department.

Equity and Profits for Service.

Some municipal electricity trading advocates would like to have matters so arranged statutorily that, when there are deficiencies of income, the ratepayers, including the competing gas undertakings, should be compelled to supply the wherewithal to make good the shortage, and then when profits are made they would prefer that they should be used within the undertaking for the purpose of diminishing the cost to the consumers. That is not equity. No one could have any objection to profits being used within an undertaking to cheapen or extend the service, providing the money taken from the ratepayers for the purpose of meeting deficiencies is first repaid. That is altogether a different matter from the old policy of using the profits of municipal undertakings to aid the rates. To repay to the ratepayers what has been taken from them is only a just liquidation of debt. But the policy of many responsible for municipal electrical trading concerns to-day is to ignore the past relief received from the ratepayers, and to urge for power to apply profits to develop the service. The latter is good, but not the former; and that the former should be righted should be a condition precedent to the application of the profits-for-service principle. The advocacy of the policy is due to the high cost of the service for purposes other than lighting—service including apparatus, installation, energy, and maintenance. The matter was raised at the meeting of the Municipal Electrical Association by the Mayor of Hackney (Mr. Councillor W. Hammer, J.P.). He holds that a supply undertaking should provide full service, with cheap electricity available in every part of the area. What his Worship means by "full service" is that "it should provide, maintain, and repair the apparatus needed by the consumer; and, in short, make it easy for everyone to obtain at a price which he can afford, and without any incidental trouble, a service—total or partial—of lighting, heating, cooking, or labour aid." He thinks that when an undertaking is doing reasonably well, and rates for energy are reasonably low, the surplus may well be devoted to the following objects: "More generous laying of mains; freedom for the consumers from vexatious charges on service connections, expensive meter-rentals, &c.; the adoption of an assisted wiring scheme; hire of cookers and other apparatus"—in short, Mr. Hammer suggests that "free service to all consumers is the ideal to be sought." It may be, but not at other people's expense. When debts have been discharged, then is the time to devote the balances of profits to increasing the efficiency and stability of a municipal trading undertaking—no matter its description.

Sportive Electricity.

People go to Wembley for education, interest, and delectation. Some who went last Wednesday got more excitement than they bargained for. The time was about 10 o'clock at night; the scene, just inside one of the main entrances to the Amusements Park. Home-going visitors were walking along the road, when, at a certain spot, a singular thing happened. Some visitors were seen to clutch desperately at a neighbouring lamp-post; others showed extraordinary agility. Two Exhibition officials walking up the road indulged in a brief but sprightly dance. A newspaper boy was the next victim; and he rolled over and over on the road. Then a policeman arrived; and, after cogitation, he decided that the spot should be fenced-off by benches. There was suspicion that these episodes were due to electricity that had escaped bounds. The current in the neighbourhood was switched-off; and investigation showed that one of the cables was merrily leaking.

Unwelcome Advertisement.

There was a timely discovery of a fire in the Sheffield Cathedral on Monday night last week. Flames were seen issuing from the roof; and the fire brigade set to work with commendable promptitude. The firemen found flames shooting-up inside the organ motor room and in the vestry; but it was established that the motor room was the centre of the fire. Nevertheless, the cause of the fire is said to be "unknown." However, some people entertain the theory—and think they have good ground for doing so—that a short circuit and blown fuse caused the conflagration. The lighting system, it is reported, was also damaged. Those in charge of the Barrow Corporation Electricity Works make no dead secret of the fact that a fire which recently occurred at the station was due to a short-circuit. The outbreak was soon under control; but there was an interruption of the lighting and tramway services for over half-an-hour. A week or so later, an explosion at the Elephant and Castle substation was reported. Thomas Clark—an electrician—was found unconscious near one of the machines with his clothing in flames. He was removed to Guy's Hospital. The "Electrical Review" says the explosion was apparently due to a fuse; and the supply of electricity was only temporarily affected.

Alleged Collusion in Tendering.

A paragraph on this subject appeared in the "Memoranda" for June 11. It will be remembered that the Chairman of the Birmingham Electricity Committee had had experiences of remarkably close tendering, at prices in the neighbourhood of £9000, while a firm are supplying similar plant at £3615, and willing to extend the order at the same figure. The incident (and it is not the only one at Birmingham) led Mr. Beale to deduce that there exists a ring, or that the firms are members of the British Electrical and Allied Manufacturers' Association, which, he appeared to think, have some control over prices. Mr. D. N. Dunlop, Director of the "B.E.A.M.A.," has sent to the Town Clerk of Birmingham a little destructive criticism of Mr. Beale's statement, or at any rate he intended it to be so. He positively asserts that neither the governing body of the Association nor any member of the staff had any knowledge of the invitation to tender issued by the Corporation, or of the fact that members of the Association were tendering. On inquiry he found that the firms referred to are members of the Association, and in the interests of the Association, and owing to the publicity given to the matter, he invited them to place before him full particulars of the tenders made to the specification issued by the Corporation. Mr. Dunlop holds that the specification for the work discloses an experimental type which would have required a large expenditure on special tools and jigs, and the development of special methods of construction and insulation. In some particulars the switchboards are of a type which have never been manufactured before. On the other hand, the £3615 is for a standard design. Mr. Dunlop is of opinion that these facts justify the difference in price. As to the general charge of profiteering in the electrical industry, he suggests that a glance at the balance-sheets of the electrical machinery manufacturing concerns in the country will reveal the fact that there is no foundation for the allegation. Mr. Beale does not think there is much in Mr. Dunlop's letter which calls for a reply. The outstanding fact, in his eyes, is that five firms—all members of the Association—quoted £9000 and over for plant, while one was willing to make it for £3615, and to execute at the same rate as many more orders for similar plant as the Committee like to place with them. He also holds that the plant asked for is almost identically the same as that which is being made by the firm who are supplying at £3615. He winds up by leaving the public to form their own opinion; and, of course, the public will not trouble much about it.

BRITISH EMPIRE EXHIBITION NOTES.

THE GAS EXHIBIT.

During the First World Power Conference, many people from distant parts are passing through the Palace of Industry, and a number of them pause to inspect the Gas Exhibit on their way to the meeting place. From various sources comes confirmation of the fact that opinion outside the industry (as well as inside) is that the Exhibit is wonderful. In the office a "tell-tale" inquiry chart is hung, and this reveals the satisfactory feature of a steady and continuous rise in the daily number of inquiries made of the staff. On the last occasion that the writer inspected this chart the figure had reached close upon 100 inquiries a day.

Among interested visitors to the Exhibit last week were members of the Women's Provisional Club, with Viscountess Rhondda, their Chairman. Mrs. Wood conducted them round, and dwelt upon the features of the Seven Ages of Women and the Industrial Section.

Evidently in a hurry, last Thursday afternoon, a visitor entered the Exhibit, and straightway asked where he could find the Chinese "Lucky Cat." Though time was an object, he could spare a few moments for stroking the cat about which he had no doubt read in the papers.

WEST'S GAS IMPROVEMENT COMPANY'S EMPLOYEES AT WEMBLEY.

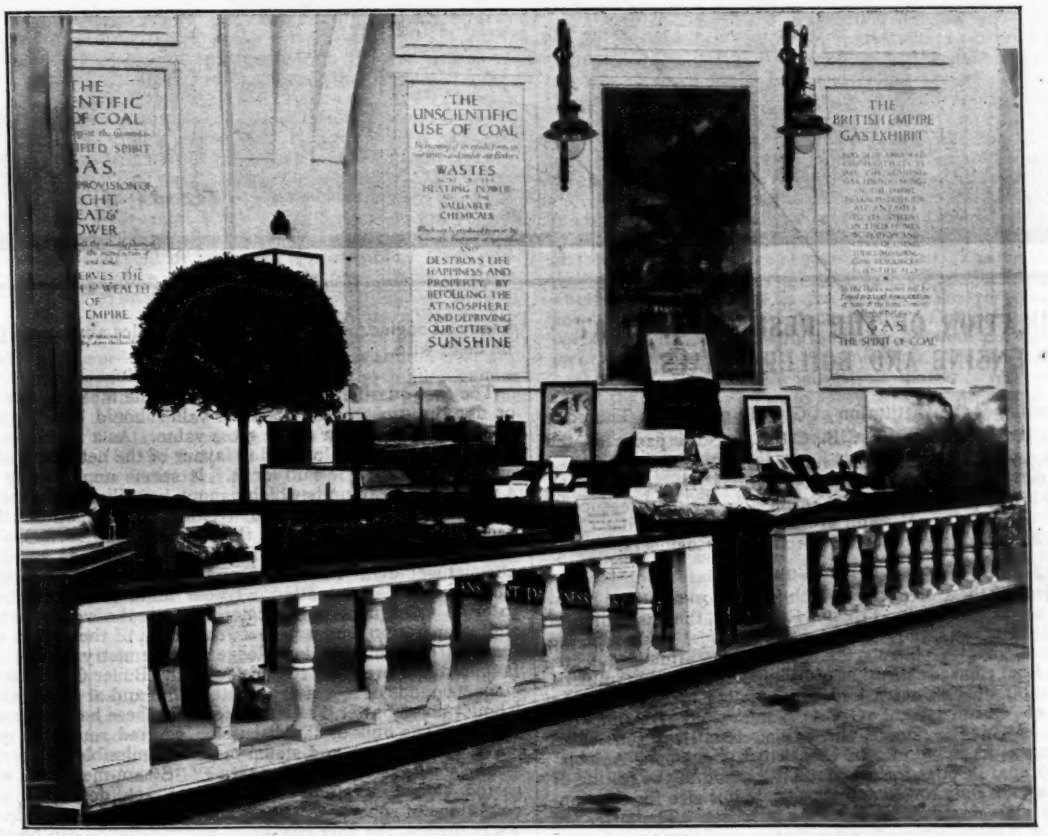
In celebration of their Jubilee, which was actually attained on April 17, Messrs. West's Gas Improvement Company, Ltd., organized a visit of their employees at the Albion Ironworks, Manchester, to Wembley on June 28. About 600 persons travelled to London in two special trains. After breakfast in London, the parties were motored round the principal places of interest in Westminster and the City, and then driven to the Exhibition. Here luncheon was served, and after a brief speech by Mr. F. J. West, the Managing Director and Chairman of the Company, the gathering dispersed, each person going his or her own way over the Exhibition and about the City until the hour of return to Manchester. An interesting feature of the visit is that prizes have been offered by Mr. West for the best snapshot taken at the Exhibition, and for the best two articles, one serious and one humorous, descriptive of the day's outing, for publication in the firm's house organ, "West's Gas." The several outdoor staffs will also visit Wembley on dates to be arranged to suit the circumstances of each particular contract.

SIDNEY FLAVEL & CO., LTD.

A description of the exhibit of this firm was given in the "JOURNAL" for May 28, p. 591. It is of interest to note that during a recent visit to the Exhibition, their Majesties the King and Queen and H.R.H. the Prince of Wales visited this stand, and were much interested in one of the actual kitcheners which was exhibited at the Great Exhibition held in Hyde Park in 1851, and which was inspected by Queen Victoria. Their Majesties compared the old kitchener with the modern ones beside it, and remarked upon the changes which had taken place in design.

VICKERS' VARIETY.

The first impression created in the mind of the visitor to the big stand of Messrs. Vickers, Ltd., in the Palace of Engineering, is the variety of their work. The Research Laboratory itself—to mention only one of the attractive displays—is equipped with many fascinating instruments devised for the measurement of minute physical actions, for the microscopic and spectroscopic examination of metals, and for ensuring that all constructions can be made true to size. The existence of this laboratory as an item in their display must be accepted as testimony that Messrs. Vickers appreciate the value of experimental work, while the exhibits within give evidence of the successful results achieved. In a showcase are samples of a brass of great strength, which has the property of resisting a tension of 32 tons per sq. in. without yielding, and which will remain intact under tensile stresses up to 52 tons per sq. in. When the properties possessed by ordinary brass are remembered, the value of the research work by which the achievement was reached becomes at once apparent. Messrs. Vickers' "Crown Metal" is another example. It is a metal of important non-corrosive properties—in this case an alloy of copper, nickel, and zinc—which was produced after laborious experimental investigation. All round there is evidence of the care taken in the selection of materials and the precision of their reduction to dimensions in the building-up of machines.


THE UNSCIENTIFIC USE OF COAL
WASTES
VALUABLE CHEMICALS
DESTROYS LIFE HAPPINESS AND PROPERTY BY BEFOULING THE ATMOSPHERE AND DEPRIVING OUR CITIES OF SUNSHINE
THE BRITISH EMPIRE GAS EXHIBIT
GAS THE SPIRIT OF COAL

THE UNSCIENTIFIC USE OF COAL.
Bye-Products Section of the Gas Exhibit—the portion illustrating this.

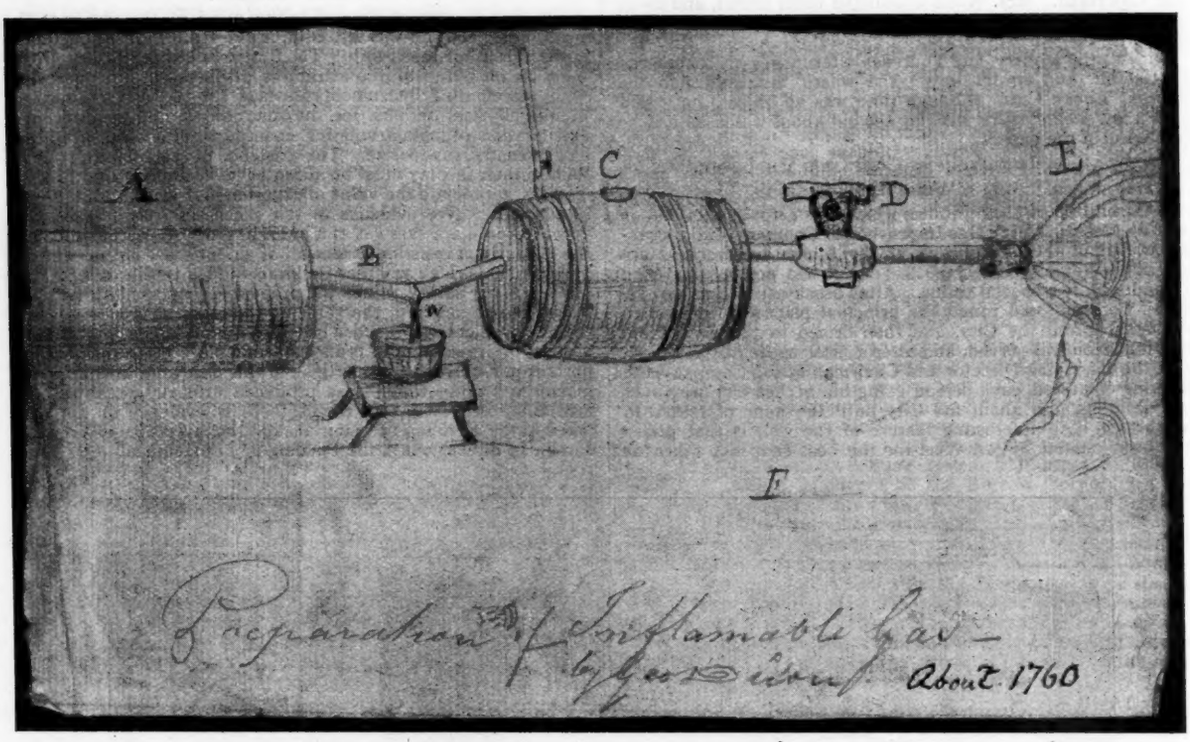
The Institution of Chemical Engineers.

The arrangements for the Second Annual Corporate Meeting, to be held at the Hotel Cecil on Wednesday, July 16, are now complete. The President, Sir Arthur Duckham, K.C.B., will take the chair at 11 o'clock, and will deliver his presidential address at noon, after which luncheon will be served. During the afternoon session, Sir Frederick Nathan will review the work of the Education Committee on "The Training of a Chemical Engineer." At 3 30 p.m. Mr. E. A. Alliott will give an introduction to his paper on "Self-Balancing Centrifugals," and a paper by G. W. Himus and Prof. J. W. Hinchley on "Evaporation in Currents of Air," will be read. Tea will be taken at 5 o'clock, after which a visit will be paid to the British Empire Exhibition, and a tour of the Chemical Hall made under the guidance of Mr. W. J. U. Woolcock.

A GAS EXPERIMENT IN 1760.

In the "Journal" for Oct. 17, 1923 (p. 204), under the heading "Murdoch Challenged," we mentioned that Mr. Waynman Dixon, of Great Ayton, put forward the claim that the credit for the invention of gas lighting belongs to George Dixon, of Cockfield (born 1731, died 1785), owner of many collieries in Durham County. The article referred to contains an extract from "A General View of Agriculture of the County of Durham" (published 1810, and written by his nephew, John Bailey, of Chillingham) relating to two experiments made by George Dixon about 1760. We are now able to publish an interesting copy from the original sketch of the apparatus which Dixon employed. The experiment is described in Bailey's book (pp. 191-2) as follows:

"Wanting to know the quantity of tar produced by a ton of coals, he erected a furnace with a large cast-iron boiler, in which the coals were put. To this were fixed two large cast-metal pump tubes; one of them was passed through water in order to condense the oil and tar, the end of this was filled by a wooden plug, with a hole to let out the tar, &c. Towards the end of the experiment he placed the flame of a candle to this hole; the inflammable gas immediately burned with a large flame, to extinguish which he struck it with his hat; the flame was driven inwards, the gas in the inside of the apparatus took fire as quickly as gunpowder, and exploded with a report like a cannon, driving out the wooden plug to a great distance, and exhibiting a cylindrical body of flame of several yards length."



TABULATION OF THE RESULTS OF HEAT ENGINE AND BOILER TRIALS.

At a meeting of the Institution of Civil Engineers on Thursday last, Capt. H. Riall Sankey, C.B., C.B.E., read a paper on the general scope and objects of the work of the Committee on Heat Engines and Boiler Trials. Mr. Basil Mott, C.B., occupied the chair, and interest was added to the meeting by the presence of Mr. Lowe and Mr. Orrok, who are members of a similar Committee of the American Society of Mechanical Engineers.

Purpose of the Committee.

The object of the Committee, which is composed of four members each of the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Electrical Engineers, the Institution of Naval Architects, the Institute of Marine Engineers, the North-East Coast Institution of Engineers and Shipbuilders, the Institution of Engineers and Shipbuilders in Scotland, the Institute of Chemistry of Great Britain and Ireland, the Institution of Gas Engineers, the British Electrical and Allied Manufacturers' Association, and the British Engineers' Association, is to prepare Codes for the standardization of the testing of heat engines, not only for commercial trials, but also for the comprehensive trials required for scientific purposes. The latter are intended for making comparisons with the performance of other similar types of plant, for accumulating information that will be of value to designers and others interested in the production and use of such plant, and also for formulating laws and checking theories governing the performance. Trials for commercial purposes require in general only such measurements as will establish whether or not a guarantee given by the vendor has been fulfilled as regards efficiency, performance, and output. The fundamental difference between trials for scientific and commercial purposes is that the former require the measurement of losses.

The following Codes are being prepared: Boiler and its accessories, steam reciprocating engine, steam turbine, condensing plant, gas-engine, gas-producer, petrol and paraffin engine, and heavy oil engine. By combining these Codes any actual plant can be dealt with.

Subjects Discussed.

The first question to be discussed at the meeting was whether or not the gross or net calorific value should be adopted; and opinion was in favour of the gross value. As a matter of fact, no arguments were put forward in favour of the net value, which has certainly much to be said for it. It seems unnecessary to debit a plant with heat units which cannot be utilized, when there are no insuperable difficulties in avoiding it, and when all that is necessary is a specification of the net value adopted. One speaker suggested that by employing the gross value the services of a chemist would be eliminated, and that all one had to do was a simple bomb determination. To our mind the determination of calorific value in a bomb calorimeter is the very reverse of a simple operation, and a proper realization of the results afforded requires considerable knowledge of chemistry. The meeting favoured the proposal to omit from the Boiler Code the expressions "pounds of steam evaporated from and at 212° Fahr.," and "boiler horse-power," as it was felt that these had become meaningless. The bulk of the discussion centred round the question, "Are water-meters and steam-meters admissible in comprehensive trials for scientific purposes?" Steam-meters, it was suggested, have a margin of error of 4 to 5 p.ct., depending upon the conditions of superheat, the oil content of the steam, &c. As to water-meters, the only one upon which reliance can be placed is the Venturi meter in conjunction with a centrifugal pump. The main source of error can be avoided in this type by eliminating pulsation; and many speakers thought its accuracy equal to any weighing operation, in which the purity of the water and the allowed tolerance of the weighing machine have to be taken into account.

Utilization of Shale.—The West Somerset shale oils, said Dr. W. Forbes Leslie, in an address at Birmingham last week, give a yield of 30 gallons of oil per ton. They are on the surface of the earth, and can be blasted and quarried at 3s. per ton, whereas the Scottish oil shale—which yield larger profits—costs 16s. per ton to mine, while its oil content is about 13 gallons per ton.

THE FIRST WORLD POWER CONFERENCE—GREAT BRITAIN.

BIG ATTENDANCES AT WEMBLEY.

The first World Power Conference, now in session at Wembley, is a big affair; over 400 papers falling to be presented between June 30 and July 12 to the large number of sections into which it has been necessary to divide the proceedings. On Monday of this week the Gas and Fuel Section met, to consider eight papers which had been listed for the occasion; but our report of what then took place is necessarily held over, with the exception of extracts from two of the papers, and the speeches at the luncheon on Monday.

PREPARATION OF FUELS.

Meanwhile, it may be mentioned that, by arrangement, four of these papers were presented, along with nearly a dozen others, on Thursday last, for consideration by the Section devoted to the Preparation of Fuels.

The procedure adopted in this Section was that the Chairman (Dr. D. S. Jacobus, Past-President of the American Society of Mechanical Engineers) should call upon the different authors to introduce briefly, if they desired, their various contributions—which were in most cases formally presented to the meeting, and taken as read. Then ensued a discussion covering some of the points which had been raised by the papers. As we shall be referring again to the papers, which were re-submitted to the Gas and Fuel Section on Monday, it is unnecessary to deal with them at length here; but a brief indication may be given of the trend of the discussion, which brought out a number of points of interest to "JOURNAL" readers.

LIQUID BYE-PRODUCTS OF COAL CARBONIZATION AS SOURCES OF POWER.

When the paper on this subject, by Mr. W. Gordon Adam, B.A., was reached, Mr. F. M. Potter (who appeared on his behalf) gave a translation of a French summary of the paper. This stated that the British gas industry at present produces about 168 million gallons of tar as a bye-product, and that coke ovens yield 153 million gallons. From the standpoint of power production, interest in coal-tar distillation is mainly confined to the light oil distillation and the pitch. The latter represents 50 to 60 p.ct. by volume of the tar. The former contains the benzene hydrocarbons, which are separated and marketed as a motor spirit. The benzene hydrocarbons recovered from the tar represent only part of the total light hydrocarbons yielded by the coal. Larger quantities are obtained by direct extraction from the gas, using either solvents or adsorbents. The former method includes the various forms of oil washing, and is now general practice in coke-oven installations, but only by a few favourably placed gas-works which can refine their own product. The latter method depends on the use of such substances as silica gel or activated charcoal. Much attention has recently been directed to these solid adsorbents, and it is not yet possible to decide whether charcoal or silica gel is preferable. Each possesses its own distinctive advantages. The possibilities of these adsorbents seem to open up a large field for intensive benzole recovery whereby, seeing that gas-works maintain a day-to-day output of gas, a regular home supply of benzole could be secured—probably of the order of 27 million gallons per annum over and above to-day's supplies, which stand at 18 to 20 million gallons per annum. This would assist in placing a limiting factor on the price of petrol. It could also with advantage be admixed with petrol, rendering the latter more suitable for use in high-compression engines. In the final analysis, the practical success or failure of a benzole extraction process must, of course, depend on financial factors. The product obtained by oil washing of coal gas loses an unduly high percentage of valuable constituents—non-polymerizing unsaturated hydrocarbons—during purification according to current methods. If the control specification for motor benzole were slightly altered, the treatment could be so modified that all this loss would not be incurred. Experiments using adsorptive charcoal or silica gel—granting such altered specification—have given results of high promise, and it seems possible that in future both small and large gas-works may be able to instal such an adsorptive process and produce an excellent motor spirit without resorting to any further refining. The employment of silica gel in place of the usual sulphuric acid reagent in the refining of oil recovered benzole also promises to yield a useful economy. Proposals have been made to utilize as fuel the hydrogenated products of naphthalene and of phenols, but unless the price of the preliminary materials involved falls considerably, the proposals have small prospect of commercial success. Finally there may be mentioned the application of the Bergius process to the hydrogenation of low-temperature tars. In some cases the process has afforded encouraging results, but the proved application of these tars has yet to be shown.

"The Conversion of Coal into Oils" was dealt with by Dr. Franz Fischer (Germany), who, by way of explanation, pointed out that only certain constituents of coal can be converted into oils by means of destructive distillation. In this way the larger molecules are broken up into smaller ones. About 10 p.ct. of low-temperature tar is low boiling, and has the characteristics of gasolene. The greater part boils above 200° C. Theoretically it is possible entirely to convert coal into hydrocarbons by means of hydrogenation, but he could not say that, up to now, direct hydrogenation of coal has proved a practically realizable process for obtaining valuable liquid motor fuels. The products of hydrogenation of coal are chiefly high boiling. Another way for the conversion of coal into oils is provided by synthesis from gases. As opposed to destructive distillation and hydrogenation, the larger molecules are synthetized by smaller ones. By gasifying coal or coke into water gas, one can transform the water gas into synthetic oils by means of a high-pressure catalytic process. The mixture of synthetic oils called "Synthol," of a boiling-point below 200° C., may be used as a motor fuel instead of gasolene or benzole.

Dr. R. Lessing, joining in the discussion, remarked that from Dr. Fischer's theoretical deductions it was clear that we can never hope to convert the whole of the coal substance into liquid by hydrogenation. This is fairly obvious, when we consider the carbon to hydrogen ratio in the coals and in the oils which have to be produced from them, quite apart from the question of the oxygen content of the coal. The most interesting promise the author held out seemed to be the question of synthesis of liquid compounds—they are not entirely hydrocarbons—from gas. This appeared to be, from the general economic point of view, the only avenue which allows us to hope that a less limited amount of liquid fuel can be obtained from coal than we have so far been led to expect by mere distillation processes. If we can synthetize from gas liquid products which can be used as fuel, then the whole of the carbon content of the coal supply will be available. The only trouble is that the actual technical questions involved are of enormous difficulty, and it will be some time yet before a scheme on these lines will come to practical fruition.

Replying to an inquiry as to whether a plant on the Bergius system recently established in Germany to convert coal into liquid fuel is meeting with considerable success, Dr. Fischer stated that he did not know whether the process is a success in that country.

LOW-TEMPERATURE CARBONIZATION AND PULVERIZED FUEL.

Introducing a paper on "The Treatment of Coal with Special Reference to Low-Temperature Carbonization," Prof. Henry E. Armstrong, F.R.S., urged that public opinion will soon compel the use of smokeless fuel, though, after having been a spectator of the work that has been carried on in this country during the last twenty years, he feels that attempts hitherto made to solve the problem have been but partial, and always unsystematic in character. If we are to succeed, the work must be undertaken in no narrow spirit, but with due regard to the magnitude of the task and the many interests concerned. The work must be done by chemists and engineers in conjunction. Hitherto it has been almost entirely in the hands of the engineer, who has not been sufficiently alive to all the points. The carbonizing of coal with the object of producing a smokeless solid fuel is not the only matter to which we have to give attention. The main object is the better utilization of coal as a fuel. The question will arise whether we should not in the future make very large use of powdered smokeless fuel industrially. The point of real importance in connection with the paper, he went on, was the treatment of the coal prior to carbonization. At the present time coal consists largely of incombustible matter. We have to pay to get that from the mine, to carry it to the user, and to handle it. Cannot methods be devised to make it possible at the source of origin to get rid of almost all the incombustible matter? That is the great problem of the future. Mr. E. V. Evans has shown that if a caking coal can be ground and mixed with a certain proportion either of ground coke or non-caking coal, and the mixture be briquetted by pressure alone, the briquettes may be carbonized at the high temperatures customary in town-gas practice, and gas produced similar both in quantity and quality to that now obtained, and yet the coke produced has more or less the properties of low-temperature coke, inasmuch as it is easily combustible. The Professor has heard the same applies to finely-ground coal carbonized at a low temperature. He exhibited, as a specimen of low-temperature carbonization, a piece of coalite made from Kent coal. The great disadvantage, he said, of using Kent coal is its extreme friability. This product, however, possessed no friability in the ordinary sense. It was produced by carbonizing in iron receptacles at a temperature of 600° C. in four hours, and, he thought, illustrated the value of compacting the coal before distillation.

"Low Temperature Carbonization" was also dealt with by Dr. C. H. Lander (Director of Fuel Research under the Department of Scientific and Industrial Research), who, in submitting his paper, said that, while agreeing that complete practical and economic success has not yet been demonstrated, there is promising work going on in different parts of the country on a very large scale. He is fully in accord with the need for very complete co-operation between chemists and engineers. Up to comparatively recently, work has been too much localized by either one profession or the other. Trouble has always manifested itself in the form of the economic difficulty. In this country probably something like fifteen or twenty suggestions have been tried, some under Government auspices, some financed by private capital; and the problem is not yet completely solved. Many of the

large-scale trials have produced good coke, good oil in sufficient quantity, and gas; but they have always broken down because either the plant will not stand without large sums being spent on renewals, or it is much too complicated to admit of financial success. However, there are now several types of plant in this country which are becoming very much more simplified. The paper stressed the necessity for a study of the oils, in order to get over difficulties when these oils are used for fuel purposes. For an oil to be suitable for naval and marine use, it is essential that it should possess the property of miscibility with natural petroleum. A great fault of these oils in their crude state is their lack of miscibility. Several processes have been suggested for getting over this difficulty, and one presenting very great promise at the present time is being experimented with at the Fuel Research Station, East Greenwich, and is due to Dr. Lessing.

Sir Richard Redmayne, in the course of some remarks, agreed that we must concentrate on using coal by way of distillation. The difficulty has been, and continues to be, from the domestic point of view, to produce a low-temperature carbonized fuel on a commercial basis, and in such a condition that it will bear transport. There have, however, been great advances in producing a fuel commercially, and one that will bear the rough and tumble of transport. From the point of view of the generation of power, the question is very much more simple. The separation of dirt from coal is a point of extreme importance, and is one which came very prominently forward during the late war, as everybody interested in the making of gas realized at the time. The percentage of dirt doubled during the war. "It is," he remarked "a curious thing that, when the coal trade is good, and people must have coal at any price, and those at the collieries endeavour to sell everything that is black, the percentage of dirt goes up. I do not know who is to blame for this. I suppose there is not that intense care exercised underground, or at the screens, or in the washeries, that there is when we are scrambling for orders. You will find coal is now becoming very much cleaner, because the demand is not so good as it was. Undoubtedly it is very bad economics to sell coal *plus* dirt. To begin with, the cost alone to the nation—regarding it from the national point of view—in removing hundreds of thousands of tons of stone instead of coal is on the face of it absurd. Worse than that, to endeavour to carbonize coal containing a high percentage of dirt is more than absurd. I hardly like to suggest a possible solution, but it is a solution, which the United States have gone further than anybody else in concentrating upon—namely, to purchase coal on an analysis basis. I would like to rub in the necessity, not only from the outlook of the consumer, but from the producer's point of view, of producing coal as clean as possible, because America is entering into competition with us, and it behoves us to see that our coal is clean."

Mr. Leonard C. Harvey contributed a paper on the "National Economic Power of Solid Fuel in Relation to its Scientific Utilization." He pointed out, in presenting this, that even if low-temperature plants do supply gas to town gas undertakings, there may still be a need for other methods of using the gas; and he made the suggestion that, apart from the sulphate of ammonia that can be directly recovered from the coal in process of distillation, the fixation of nitrogen from air should be considered. At Stockton there is a commercially successful plant, which is a very good start for Great Britain in the fixation of nitrogen. If the residue of the distillation works, *plus* the vast quantities of low-grade fuel not now used, could be placed at the disposal of industrial engineers in the future in pulverized form, then he maintains that the economy would be anything between £100,000,000 and £500,000,000 a year. The chief difficulty there has been in the past in regard to these distillation plants has been their excessive cost. If domestic smokeless fuel is required, it must be produced in lump form, and the only method of doing this in the past has been by intermittent retorts. The cost of operation has been rather high, and the capital outlay large; but continuous distillation plant for producing lump smokeless fuel or blast-furnace coke would be a great advance. There was a retort mentioned in the paper which will produce a sufficiently satisfactory residue fuel for subsequent pulverization, but not for domestic purposes—and that is the continuous retort of the Fusion Corporation. It is a British production, and has started well on its life.

Large-Scale Gas Producers.

Another paper was on "The Gas Producer as Applied to Large Scale Power Generation," by Mr. Arthur H. Lymn. He drew attention to the almost criminal waste of valuable materials involved in the usual methods of utilizing fuels for power generation, whereby practically the whole of the bye-products contained in the coal are thrown away. Many proposals have been made for dealing with this situation, but, he said, with the exception of the gas producer, no plant or apparatus has yet been evolved which avoids an excessive consumption of fuel. Generally the recovery of bye-products is associated in the technical mind with the carbonization of fuel and consequently with the production of large quantities of coke, and therefore, *ipso facto*, the coal is only partially converted into gas and utilized for the main object. The elimination of the coke reduces the thermal efficiency—*i.e.*, coal to gas—to approximately 25 p.ct. The modern gas producer, however, utilizes for the main purpose of gas production and power generation practically the whole of the carbon contained in the fuel, combining carbonization and gasification in one process; and therefore it seems fair to state that this is the only apparatus which really comes into the region of practical politics so far as concerns the generation of power by means of manufactured gas (*i.e.*, in contra-distinction to natural gas), because the modern gas producer, while recovering far more bye-products than a carbonizing plant, will yield in the form of gas 80 p.ct. of thermal units contained in the original coal. Moreover, the capital outlay for the gas-producer plant per unit of power produced is a mere fraction of that required for the carbonization plant, inasmuch as it has to treat only one-third of the fuel. He had therefore great confidence in asking the careful consideration by all parties interested in producing cheap power from fuel, of this entirely practical method of utilizing coal while saving all the valuable bye-products, without increasing the coal consumption, and at the same time ensuring a smokeless atmosphere—a matter of such vast importance in all industrial cities. Illustrating the Holzwarth gas-turbine, the author said that, as it is claimed that this turbine can now be built in large units for commercial purposes, with all suitable guarantees, the paper would not be complete without some description of this new prime mover.

GAS AND FUEL SECTION LUNCHEON.

The Gas and Fuel Section had a very largely attended full day's session at the First World Power Conference, at Wembley last Monday; eight papers being presented and fully discussed. These will be dealt with at a later date in the "JOURNAL." At the close of the morning sitting a party of over a hundred, including many prominent men in the gas and electrical industries, and other distinguished visitors, were the guests at luncheon in the Stadium Restaurant, of the Chairman (Mr. D. Milne Watson) and members of the British Empire Gas Exhibit Committee. Mr. MILNE WATSON (who had also presided at the preceding business session) was in the chair.

Distinguished Visitors.

After the honouring of the Loyal Toast,

The CHAIRMAN said: Lord Newton, ladies, and gentlemen, I rise with very great pleasure to give you the toast of "The Visitors." I am particularly pleased to be able to do so, considering what a number of distinguished men we have in our midst. I need only refer to Lord Newton, on my right, who works so hard and does so much on behalf of smoke abatement; Sir John Snell, who is our honoured guest to-day, and one of the three distinguished Commissioners for Electricity; Mr. John W. Lieb, who comes all the way from New York, and who is an electrician, and who told me on the way up to the Stadium to lunch that he had every right to be here because his electricity undertaking was owned by a gas company. That is just as it ought to be. Then we have Mr. D. N. Dunlop, who is the Organizing Director of this great Conference, and words entirely fail me to express my admiration of Mr. Dunlop and his organizing ability. The work involved must be enormous, and its success is due to the great organizing ability of Mr. Dunlop. We have also with us Mr. Percy Ashley, C.B., from the Board of Trade, with Mr. Honey, the Gas Director, who needs no introduction, of course, to you. We have Mr. Fieldner and Mr. Brooks, from the United States, and many distinguished foreign guests. To these and other gentlemen who have honoured us with their presence, we offer a most hearty welcome. I think you will agree that this Conference has been an enormous success. It has been called an electricity show. Well, we are not at all hostile to electricity. Indeed, most of us use electricity in our works, and we want to be friendly, though we are to a certain extent their rivals. Electricity should never forget that it uses and lives on other sources of power. ["Hear, hear."] It is this aspect of the case, perhaps, that most strikes the gas industry. The gas industry, on the other hand, is one of the primary industries, if I may say so. That is why we have been telling you from time to time what a great industry it is. That is why I said recently that the Gas Light and Coke Company supply as much energy as the whole of the electricity undertakings of the country put together.

The Missions of the Gas Industry.

We of the gas industry regard ourselves as having two great missions to fulfil to-day—the first is to conserve the wealth of the country in its coal deposits, and the second is to preserve the health of the country by making the atmosphere purer and better. As I have said, we look upon electricity as a more or less secondary industry. It represents itself sometimes as heaven-sent, but in reality it has to use coal or coke to raise steam, or else it generates electricity by means of such "low things" as gas-engines. Or it may go to waterfalls, or make use of petrol, or even the wind, and now electricians are talking about harnessing the tides, and making electricity in that way. We wish them all success and prosperity in their great adventure. We have heard a great deal this morning about co-ordination and co-operation. It is obvious that if the nation is to be well served we must make the best use of the national resources. It is an interesting question as to how these can best be co-ordinated. I think the country will probably be best served if we are allowed to fight it out among ourselves.

Lord Newton on Smoke Abatement.

The Rt. Hon. Lord NEWTON: In responding to the toast which has been proposed by our Chairman, I feel that I ought to begin

with an abject confession. I know absolutely nothing about gas or science, and as regards all mechanical appliances I am exceptionally stupid; and it is perhaps in view of this ignorance that I was selected to be Chairman of the important inquiry on smoke abatement that has been alluded to by Mr. Milne Watson. There are, however, certain facts in connection with this inquiry which are obvious to the dullest intelligence, and one thing that struck me more than anything else was that the consumption of raw coal for heating was one of the most foolish and wasteful habits in which we indulge. In fact, it has occurred to me, and probably to many others, that the possession of cheap coal in this country is in some respects a doubtful advantage. At all events, it is to our disadvantage that it has resulted in this country being perhaps the dirtiest country in Europe, or in the world. There is a Smoke Abatement Bill before Parliament at the present moment, and the reason I accepted your invitation and came here this afternoon was to impress upon all connected with the gas industry that it is most desirable in their own interests—not only in the interests of the country, but in their own interests—that legislation of this kind should be passed with the smallest possible delay. ("Hear, hear.") Everybody admits the evil of what is called the "smoke nuisance," and you will hear many people say that all that is required is to educate the people on the subject and to convert manufacturers to more sensible processes. I do not in the least believe you can carry out reforms of this character by preaching in that way. You will get no reform of this nature until you introduce legislation of some kind or other. There is no point in a manufacturer's introducing new processes for removing smoke at the present moment. He looks at the matter from his own point of view, and carries on his operations as cheaply as possible, with the inevitable result. But if you once pass legislation to deal with a nuisance of this character, every manufacturer will be obliged to resort to other means, and will fall back upon either gas or electricity—and heaven forbid that I should express an opinion in favour of one or the other! I have expressed my conviction that it is directly in your interest that you should do your best to further legislation of this kind. What I would also like to impress upon you, as an old parliamentary hand, is that you will never get Parliament to undertake legislation of this character unless they think there are some votes to be got out of it. There is a very important social aspect of this particular question. It must have struck the most stupid person that it surely cannot be a pure coincidence that the most discontented people reside in the districts which suffer most from the smoke nuisance; and I do not think it is in the least surprising. If I had been brought up in the precincts of some places I have visited, I expect my outlook would have been very different from what it is. This is not a local question; it is not a question of private gain or loss, or anything of that sort. It is really a national question; and it is for this reason I would urge you to do all you can to promote the legislation of which I have spoken. I will conclude by saying, as far as I personally am concerned, that from the experience I have gained I feel it is my duty to advocate as much as possible the use either of gas or of electricity, in order to remedy the conditions that prevail in this country. I believe, if we can make a greater impression, and succeed in carrying out our ideas, we shall be helping, not only to make this country a cleaner one, but a more healthy one, and one which will be generally more agreeable to live in for all the inhabitants.

Co operation between Gas and Its Younger Sister.

Sir JOHN SNELL (Chairman of the Electricity Commissioners, and Past President of the Institution of Electrical Engineers): Though the official head of a department which is avowedly out to develop electricity for all it is worth, I feel it is a very great compliment that I have been asked to be here as one of your guests at this luncheon to-day. It may be that some of the critics might say that "this is magnificent, but it is not war," but, on the other hand, I should prefer to be with those who thought that it was a very chivalrous magnanimity on the part of the Chairman and members of the British Empire Gas Exhibit Committee to have taken such a stranger within their gates. I am not sure, however, that I am such a stranger within your gates, because I can number among my friends such gentlemen as Mr. Milne Watson, Dr. Charles Carpenter, Mr. Harry Jones, Mr. Frank Jones, Mr. Goodenough, and Mr. Paddon, and many others. Really therefore I feel that, so far from being a stranger, I am, though following another industry, among friends. ["Hear, hear."] Some of us have listened during the last week to a great deal of discourse upon the merits of electricity, and I think the dominant note has been about those countries which are blessed with great natural water power resources. It is not a proper comparison to think of this country in terms of those countries which are so blessed. Where there is great natural water power, electricity must be the agent for the distribution of power, or heat, or light; but it is the fact that in this country there has been, and there is, a great gas industry. And though I shall say nothing, I hope, which will in any sense be treasonable to those electrical interests which I am bound to stimulate and to develop in my official position, as a citizen I cannot forget that there is this great gas industry, and that it is our duty to see that the capital which has been invested in it, and the labour which has been devoted to it, are not lost to the nation. I remember when Sir Arthur Duckham was Controller of the Ministry of Munitions during the war he remarked to me that the proper thing to do in this country was to appoint a Commission—not such as we now have for electricity—but to deal with the whole problem of the supply of power, heat, and light. Whether or not that may yet come is a matter for the future, but I am sure of this—that, inasmuch as this Conference has been convened for the purpose of conserving the great natural resources of the various countries, it should be borne in mind that in this country particularly, where we are living upon a wasting asset, it is of the greatest importance that the fullest co-operation should take place between gas and its younger sister the electrical industry. I do not think that we have been of disservice to you, because, though I am sure that the active brains in control of the gas industry would sooner or later have arrived at the same ends, I believe the fact that electricity has sprung up as it has done since the nineties, has accelerated the development which has taken place in your own industry, and that the really wonderful development of domestic apparatus and of the applications of gas to various industrial purposes has been fomented and assisted by the rival industry of electricity supply. I hope that in the years to come, with a view to conserving the deposits of coal in this country, there may be greater co-operation brought about between this great industry of gas and what I trust will prove to be the great industry of electricity supply. It is the fact, I believe, that last year 18 million tons of coal were consumed by the gas supply industry, and only 7 million tons by electricity. I do not mean you to infer that the supply of electricity is necessarily more economical. Where you have sunk capital on your great systems of distribution, I do not think that anything we can do in the electricity industry is likely to oust you from your position, but there are districts, of course, where electricity can be distributed—over distances which I understand it is not economical to distribute gas, in spite of your high-pressure mains. I do look forward to the time when these two great industries will not be regarded as rival factions, but when, in the national interest, there shall be brought together into counsel for the best development of the resources of this country the combined brains and intelligence of both.

Individualism Should be Preserved.

Sir DUGALD CLERK, K.B.E. (Past-President of the Institution of Gas Engineers and of the Society of British Gas Industries): I need hardly say how much we all value Sir John Snell's very proper appreciation of, and very kindly interest in, the gas industry. I agree that a combination of the two industries is a very desirable and a very needful end. At the same time, I rather fear any great interference with the individualism that is characteristic of our race. We all like to go our own way, and I am not in favour of invention or business by committee. A committee is the worst possible means of securing invention of anything new. Committees always play for safety, and the inventor can never play for safety. He must look ahead. I am all for co-operation with the electrical industry, but I do not wish the co-operation to be official. It had better be unofficial, such as we have at present.

Mr. JOHN W. LIEB (American Institute of Electrical Engineers): I am connected with the electricity division of the Consolidated Gas Company of New York, and I may say that we feel in the States that the gas industry and the electrical industry can go together, having both as their ideal the rendering of a necessary public service. In the development of the two industries in the State of New York, the electricity department proceeds hand in hand with the gas department. There is intensive rivalry, of course, to the benefit of both, as it keeps each "keyed up."

INTERNATIONAL ADVERTISING CONVENTION.

Public Utilities Section.

In connection with the International Advertising Convention, to be held at Wembley from July 14 to 17, there is to be a Public Utilities Advertising Section, which will meet on Tuesday afternoon, July 15, and Wednesday morning, July 16. The meeting on Tuesday will be preceded by a luncheon to the delegates, at the invitation of Mr. F. W. Goodenough, Chairman of the British Division of the Section Committee, who will preside at the afternoon meeting. The chair on Wednesday will be taken by Mr. F. LeRoy Blanchard, the Chairman of the American Division of the Committee. The Vice-Presidents include Mr. D. Milne Watson and Sir William Kay.

A number of papers are listed, and of those named below the first two will be taken on Tuesday afternoon, and the other two on Wednesday morning.

"Company Ownership and Operation under Public Control." By Mr. JACQUES ABADY, Barrister-at-Law.

"Co-operative Advertising of a Public Utility." By Mr. W. M. MASON, Manager of the "B.C.G.A.," and Lieut.-Col. W. A. VIGNOLES, D.S.O., M.Inst.E.E., Borough Electrical Engineer to the Corporation of Grimsby.

"Education in Relation to Public Utilities," by Mr. M. C. ROBBINS, Publisher of the "Gas Age-Record," New York.

"Municipal *versus* Company Ownership." By Mr. B. J. MULLANEY, People's Gas Light and Coke Company, Chicago.

THE LIQUID BYE-PRODUCTS OF COAL CARBONIZATION AS SOURCES OF POWER.

By W. Gordon Adam, B.A.

Extracts from a World Power Conference Paper.

In the general economic scheme for power, light, and heat development in Great Britain, the gas industry may well claim to occupy an important position; its claim being based on its past achievements and its future scope and possibilities. The carbonization of coal under gas-works' conditions produces with relatively high thermal efficiency the splitting-up of the raw material into a gaseous fuel, a solid smokeless fuel, and liquid bye-products that are in part available as sources of energy development. These three classes of products are capable of employment with satisfactory results from economic, thermal, and hygienic points of view. Carbonization under coke-oven conditions yields equally good results, the solid fuel in this case being destined for metallurgical purposes.

The Liquid Organic or Oil Bye-Products.

The average yields in gallons of tar under horizontal and vertical retort and coke-oven conditions are approximately 10·5, 14, and 8½ gallons respectively. Recently much attention has been directed to low-temperature carbonization. The results vary with the nature of the original coal, the temperature employed, and the particular system of carbonization. As a general guide, the yield of tar may approximately be estimated as 20 gallons per ton of coal treated. The commercial merits of this type of process have yet to be proved.

The British gas industry at present carbonizes about 16½ million tons of coal per annum, producing 168 million gallons of tar as a bye-product. The coke ovens under maximum conditions consume 18 million tons of coal, and produce 153 million gallons of tar. Low-temperature carbonization enthusiasts hope to see their solid products adopted in place of coal by fuel consumers for domestic, railway, electric power, and factory purposes, which represent respectively about 15, 8, 4, and 25 p.ct. of the home consumption. If the whole of this fuel could economically be supplied by a low-temperature process, the tar available would be 1900 million gallons. These figures exclude the possible recovery of light hydrocarbons by further scrubbing of the gas; the latter in all the above cases would yield approximately 2½ gallons per ton of coal treated.

From the viewpoint of power supply the properties of these tars, with the exception of that produced by low-temperature carbonization, may be considered together. They consist in the main of aromatic compounds, principally hydrocarbons, together with varying percentages of phenols and a small content of bases. Horizontal-retort tar is distinguished by a relatively high content of pitch, naphthalene, and anthracene, and the absence of paraffin hydrocarbons; that from vertical retorts contains a smaller percentage of solid hydrocarbons and of benzene and a higher content of phenols, toluene, and xylenes; paraffin hydrocarbons are present to a small but definite extent. Coke-oven tar is intermediate between the other two. The commercial employment of all these tars is in general determined by the factors that are common to each.

The Use of Silica Gel and Charcoal.

The present-day interest in coal carbonization in so far as liquid bye-products for power purposes are concerned, is almost exclusively confined to light distillates—benzole and toluole—obtained in part directly from the tar, and in greater amounts by the process of gas scrubbing.

During the past two years considerable attention has been devoted to the use of absorbent materials, such as silica gel and active charcoal, as a means of removing the benzene hydrocarbons from gas. The use of the former has been developed by the Silica Gel Corporation in America, and of the latter by the Union Carbide Laboratories Inc. in America, by the Bayer Company in Germany and by the Urbain Company in France. Silica gel is obtained by the acidification of a solution of sodium silicate, followed by the removal of the sodium salts from the gelatinous silica so formed, and subsequent elimination of water at gradually increasing temperatures up to 600° C. A highly porous product of excellent absorptive capacity is obtained. The American charcoals are produced from wood, &c., by a controlled carbonizing process, followed by steam oxidation of the remaining hydrocarbons. German charcoals would appear to be obtained by a preliminary carbonization of peat, wood, lignite and the like, followed by the addition of an inorganic salt, such as iron or zinc chloride, further carbonization, and then removal of the salt by leaching. A product is obtained which, while showing a high absorptive capacity, has the additional merit of a high resistance to disintegration by mechanical action or by steam. Active charcoals of British and French origin and of high absorptive capacity are also now available.

It is not yet possible to compare fully the relative merits of the two materials as absorbents. The distinguishing properties of the silica gel are, first, that it shows a preferential attraction for water, and secondly that, being highly resistant to chemical and thermal action, it can easily be re-activated by submission to relatively high temperatures which serve to burn off the "poisonous" material absorbed from the gas. Charcoals, on the other hand, can be employed in a moist condition, containing 10 to 12 p.ct. of water when operating on a gas of normal benzole content—that is, in the condition in which it is left after removal of the absorbed hydrocarbons by steam at 130° C. The product once poisoned cannot be re-activated by carbonization without a loss of 10 to 12 p.ct.; but this difficulty is avoided in practice by the use of a prefilter containing a cheaper charcoal, the part loss of which is not a serious economic factor. This prefilter absorbs the naphthalene and those gum-forming hydrocarbons that may be present in the gas, and in particular ensures a prolonged life for the main benzole filters.

Silica gel is employed in a static process, in which gas is passed through a bed of the absorbent until the latter is saturated; and the hydrocarbons are then removed by a current either of steam or of hot air, or, alternatively, in a dynamic process whereby the powdered gel is blown by the gas under treatment through a series of absorbers, the gel and gas passing in countercurrent, and gel is finally recovered in cyclone extractors. Removal of the hydrocarbons may then be effected in a rotary activator heated to a suitable temperature by hot gases passing through a series of hollow shelves.

Charcoal, by virtue of its relatively lower resistance to abrasion, does not readily lend itself to the latter procedure, and the benzole is therefore removed by steaming *in situ*.

The recovery of benzole hydrocarbons from gas by means of such solid absorbents seems widely to extend the possibilities of increasing the benzole production of this country. In 1918—that is, during the war period, when gas washing was in practice at the more important gas-works—the production reached 26·4 million gallons. By 1921, gas-works had—with two or three exceptions, owned by companies which were favourably placed in that they were able to rectify their own crude product, and market the finished article—ceased to recover benzole except in so far as it is condensed with the tar; and the total production was 14 million gallons. During 1923 an expansion in the coke-oven output increased the total production of benzole to 18 million gallons. The coke-oven proportion fluctuates with the conditions obtaining in the metallurgical industry, but gas-works in this country are carbonizing coal steadily, year in and year out, in quantities which show a regular tendency to increase. The increased heating load has tended to flatten the consumption curve, and the regularity of the operations offers a good foundation upon which to build further developments. If all the gas-works of this country were to instal recovery plants working at a 66 p.ct. removal of benzole from the gas—equivalent to 1⅛ gallons of benzole per ton of coal carbonized, a figure that has been found suitable to gas-works conditions—the annual production of the United Kingdom would be increased by 27 million gallons, and the total production in this country from coke-ovens and gas-works could be brought up to (say) 45 to 50 million gallons.

This amount of motor spirit would not be sufficient to meet the nation's needs, the imported petrol in the month of January, 1924, figuring at 29,370,824 gallons. Nevertheless, the supply in the competitive market would at least be such as to ensure that the price of petrol imported from foreign countries would be kept within reasonable limits, and the quantity would provide a useful safety factor in time of national stress. Again the advantages shown by aromatic hydrocarbons as constituents of petrol are now fully recognized, and the Government specification for aviation spirit calls for a definite minimum content of benzole hydrocarbons.

This desirable movement requires, first, that the removal of benzole should financially be profitable, and secondly that the plant processes should be simple in character and lend themselves to easy operation by such labour as is available on small gas-works.

Gum-Forming Compounds.

The product recovered by the oil-washing process contains unsaturated compounds, partly removed as such from the gas and partly formed by the decomposition of the wash oil. Certain of these unsaturated compounds readily polymerize to form gums, and on this account must be removed from the spirit. This is effected according to present practice by a treatment with sulphuric acid of 95 p.ct. strength, and separation of the acid tar thus formed, followed by washing with water and alkali and redistillation. This process is drastic in nature, removing not only the gum-forming compounds, but also practically the whole of those unsaturated compounds that are not detrimental; an additional loss occurs owing to sulphonation of benzene hydrocarbons, the latter depending on the care exercised in controlling the process. The method when properly applied, yields an eminently satisfactory product free from gum-forming compounds and elemental sulphur. As above indicated, it errs on the side of caution, affording a large margin of safety at the expense of a somewhat unnecessary and heavy loss of valuable hydrocarbons. It would appear to be desirable that a control specification for motor spirit should be imposed which would ensure the absence of gum-forming compounds, but at the same time would not unduly limit the percentage of unsaturated hydrocarbons. Such a change would permit the revision of the initial chemical treatment, the acid used being reduced in quantity and strength. Alternatively the employment of silica gel offers interesting possibilities in this connection. The use of this solid absorbent for the removal, in the liquid phase, of gum-forming compounds, and of heavy sulphur derivatives, has been fully demonstrated in the case of light petroleum spirits; the results so far obtained with

benzole show good promise. In place of the acid treatment, crude benzole is agitated in three stages in counter-current with 3 p.ct. of its weight of the gel. The mixture is passed through totally enclosed rotary filters, and the spirit submitted to a final cleaning distillation. Reliable figures are not yet available concerning the losses which may be expected when this process is applied to an oil-recovered benzole, but present information indicates that it may be possible to reduce the loss to 2 to 3 p.ct.

Such a revision of the benzole motor spirit specification would open up another possibility of increasing motor benzole supplies. There is strong evidence that the gum-forming compounds already mentioned are derived largely by decomposition of the wash oil, and that the product recovered from gas by means of solid absorbents will be free from such impurities. Mr. F. M. Potter has examined for the author a number of samples of benzole directly recovered from a well-cleaned town gas by the charcoal process. The product was found to be of excellent quality and suitable for use as a motor spirit without further refining. Subject to certain modifications of the reactivation process, silica gel promises to yield similar results. This achievement is of the highest importance, as it throws open the possibility of recovering benzole at all gas-works, seeing that the process could be applied locally. It does not necessitate such chemical treatment as can only be satisfactorily carried out at a tar distillation works or benzole refinery. Having thus simplified the refining process, it will only be necessary to determine whether silica gel or charcoal is the best absorbent for benzole recovery from town gas under given conditions as to capacity, &c., in order to design complete units for motor spirit production of such a nature that they can be readily and economically operated in both large and small gas-works.

PROBLEMS FOR THE FUTURE.

Among other problems that the future would seem to have in store is the economic possibility of utilizing hydrogenated coal-tar products. Up to the present, work on these has proceeded in four different directions:

Naphthalene Derivatives.—The chief compounds concerned are tetraline and decaline. The possibility of using them will depend on their price, and that is a measure of the basic price of naphthalene, which is largely determined by the demand for it in other industries. As more vertical retorts are installed, naphthalene, owing to a diminished production, and consequently also its hydrogenated derivatives, will appreciate in value. Under artificial economic conditions tetraline was employed in Germany as a substitute for petrol. It has been claimed that its cost of production enables it to be sold at a cheaper rate than benzole. This has yet to be proved; certainly, French experience is to the contrary. Experiments have been made in Germany to devise processes whereby crude naphthalene might be employed, and to substitute water gas or coke-oven gas for the more expensive pure hydrogen; but concerning the failure or success of these endeavours the Germans have displayed a marked reticence. Unless, therefore, altered circumstances arise that would release large quantities of naphthalene at a low price, it is difficult to see how tetraline can become a serious competitor of benzole in so far as motor fuel is concerned. These remarks apply *a fortiori* to decaline, which labours under the additional disadvantage that it does not seem to be suitable for either high compressions or high temperatures.

Phenol Derivatives.—The price of the phenolic constituents of tar is at present determined by the demand in the chemical industry, and by the cost of extraction from tar oils. Until the demand ceases to a great extent, there can be no question but that the catalytic hydrogenation of these products to cyclohexonal derivatives is not an economic process in so far as power supplies are concerned.

Hopes have been entertained that it might be possible to hydrogenate primary low-temperature tars according to the Bergius process. Such tars yield approximately 35 p.ct. of hydrocarbons, 40 to 50 p.ct. of phenols, and 20 to 30 p.ct. of pitch containing but little (2 to 3 p.ct.) of free carbon. The Bergius method consists in submitting the material to the action of hydrogen at about 400° C., under considerable pressure—for example 100 to 150 atmospheres. The reaction is essentially comparable with the over process of cracking, and has for its end the production of a low boiling-point fuel, with the avoidance of the polymerization and carbonization which accompany the customary methods of cracking. Apparently lignite tars by this process have given encouraging results. How far it will be successful in the treatment of low-temperature primary tars remains to be seen.

The reduction of phenols to benzene hydrocarbons has been investigated by F. Fischer and his co-workers at Mannheim. The essential of the process is to secure the reaction by passing the phenol mixed with hydrogen through tinned tubes at 500° C. Hitherto the method does not seem to have been applied on an industrial scale. In some respects, should it succeed, it might possess distinct advantages over the catalytic reduction in presence of nickel, the more so as it should be patient of application to a crude phenolic product. The process, however, has been so little investigated that it would be idle to speculate concerning its practical possibilities.

Possibilities also seem latent in recent work by F. Fischer and Tropsch, according to which carbon monoxide and hydrogen were made catalytically to react under pressure (up to 150 atmospheres at 450° C. in the presence of iron and potassium carbonate). The aliphatic mixture thus formed, consisting of aldehydes, ketones, alcohols, &c., on further heating under pressure in an atmosphere of nitrogen, produced a mixture of liquid hydrocarbons. Naturally considerable elaboration will be necessary before this avenue of power is explored. Incidentally, in connection with such an aliphatic mixture, the synthetic production of alcohol from ethylene in coke-oven gas by the Bury and Ollander process developed at Skinningrove may also be mentioned.

COKE AS FUEL FOR STEAM RAISING.

By E. W. L. NICOL, A.M.I.E.E., M.I Mar.E., Assoc.M.Inst.C.E.,
Engineer and Fuel Expert to the London Coke Committee.

Extracts from a World Power Conference Paper.

The daily increasing extent to which we in this country are in normal circumstances dependent upon foreign countries for supplies of liquid fuels and lubricants, and the inevitable consequences of failure to maintain supplies, do not appear to be fully appreciated. It is, indeed, doubtful whether the general public realize in the least how serious the position is, and is likely to become.

The present approximate world production of coal and petroleum is 1,500,000,000 tons and 118,000,000 tons respectively. The ratio of relative importance is, however, much greater than these figures indicate. For many power purposes, petroleum is a convenient substitute for coal; but coal, or coal products, can never be a complete substitute for petroleum and its derivatives. The importance of petroleum extends beyond its use as fuel, as it forms the basis of most lubricating oils; and research has so far failed to recover from coal distillation products the heavy hydrocarbon lubricants upon which the operation of modern superheated steam engines and internal combustion engines depends.

An oilfield in production is a wasting asset. Compared with that of a coalfield, the rate of depletion is more rapid and its economic life is relatively more limited. After a comparatively brief period of exploitation, some of the first oilfields to be developed in Russia and in the U.S.A. are showing signs of depletion. New fields, capable of profitable exploitation, will no doubt be discovered; but there is at present not the slightest prospect of such development keeping pace with that at which the demand is increasing. Foreign countries, moreover, are more likely than Great Britain to discover and develop new oilfields; and in the future the race will be to those who secure in their favour a balance of comparatively cheap liquid fuels, from whatever source it is derived.

During 1918, it was stated that in America petrol consumption was overtaking production, and that the end of the economic life of the U.S. oilfields was in sight. Since then new oilfields have been discovered in California, Texas, and Oklahoma, with the result that production is again temporarily in excess of demand; but notwithstanding the present abundance and cheapness of petrol in America, it is significant that in the U.S. there has been an amazing growth in the production of benzole, the output having increased from 1,500,000 gallons in 1910 to 70,000,000 gallons in 1920. The present output finds its main outlet for motor spirit blends, but by no means does it represent the full quantity obtainable from the coal carbonized and gas produced. In Germany, too, benzole is already produced in very large quantities, and it has been asserted that before long that country will use home-produced motor spirit to the total exclusion of imported petrol.

In Great Britain, the production of benzole from native coal reached its maximum in 1918; the total output from all sources, but mainly from bye-product recovery coke-ovens and gas-works, being 26,400,000 gallons. In 1922, the output, owing to various reasons, but mainly to the competition of relatively cheap petrol, had fallen to 11,155,000 gallons. If all the available spirit were recovered from the coke-oven and town gas at present made in Great Britain, the total yield has been estimated at 46,000,000 gallons, whereas the consumption of motor spirit in 1922 in the United Kingdom was of the order of 350,000,000 gallons. The total U.K. consumption of petroleum products of all grades for the same year, according to official statistics, reached 4,631,455 tons. The present home production of motor spirit from shale is approximately 6,500,000 gallons per annum. The amount of petrol that the world can at present produce is in fact rapidly being overtaken by the increased demand.

Though many material factors have been omitted in thus briefly reviewing the situation and arriving at this conclusion, the enumeration of the foregoing facts, coupled with the knowledge that we in this country possess enormous resources of solid hydrocarbon of the best type, in the form of bituminous coal, should be sufficient to indicate the imperative need for at once embarking upon a national policy of making the most of our coal resources, for our own benefit and credit, and in the interest of those who in succeeding generations are to take up the burdens of Empire. In formulating such a policy of so developing and conserving our coal resources as to render the country, so far as possible, self-supporting in the matter of liquid fuels, one would naturally aim first at the elimination of waste at the pits, as recommended by the Coal Conservation Committee in 1918, by inducing colliery owners to recover more of the low-grade small coal at present left underground in great quantities. A greater

quantity of large coal which, by reason of its higher quality, is better able to bear heavy freights and meet competition from foreign sources in overseas markets, would thus be set free for export.

Treated at the pits for the elimination of excess inert matter, much low-grade coal is capable of profitable utilization by means of carbonization. By treating all classes of bituminous coal as raw material for the manufacture of fuels, fertilizers, and other products used in our industries, its commercial value would not only be increased, but more labour would be employed per ton of coal mined.

That our present methods of using coal as fuel are for the greater part inefficient and wasteful, is frankly admitted. Of the 189,000,000 tons consumed annually in this country, 139,000,000 tons are burned in the raw state; and, moreover, the relatively small proportion of our annual coal consumption which is treated at coke-ovens and gas-works is almost entirely of the strongly-coking description, of which available resources are comparatively small. Attention should therefore be directed to devising processes by means of which bituminous coals of *all* descriptions may profitably be utilized with a view to produce: (1) Fuel oils for internal-combustion engines and for steam raising; (2) motor spirit for road and aerial transport; (3) gaseous and solid fuels for industrial and domestic use. The successful and adequate development of such processes not only would go far to render the country more independent of foreign supplies of liquid fuels, but would tend to mitigate the coal smoke evil, and also contribute to the more economical working of the coal industry itself.

Recent research has been active in devising such processes, and also in the elucidation of the problem of finding a substitute for petrol. But of all the possible solutions which have been examined, the most promising and effective in the latter connection is, by common consent, the production of benzole in the gas-works and bye-product recovery coke-oven processes of coal distillation.

At the present time, less than 20 p.ct. of the coal used in Great Britain is treated at gas-works and bye-product recovery coke-ovens; and the proposal that no coal capable of profitable carbonization should be used in its crude state is one that should receive immediate attention.

Against such a proposal it has been advanced by responsible authorities that great difficulty would be experienced in disposing of the principal concomitant secondary product, coke; and acceptance of this view has in the past had a profound influence upon the policy of important gas-supply authorities in adopting plant and processes of gas manufacture which tend to diminish the output of coke, or to absorb coke, as in the manufacture of water gas. Much effort has also been expended in perfecting low-temperature processes of carbonization with a view to produce, for use in open fire grates, a soft coke or smokeless solid fuel possessing some of the free-burning qualities of domestic coal. The unsatisfactory position of the coke market, which reached a climax in 1913, when enormous stocks of surplus coke were the rule at all large gas-works, no doubt gave some grounds for the consideration and adoption of such methods; but the recent introduction of coke as fuel for steam raising at electric and other power stations, and the development and introduction of coke-burning domestic heating appliances, have together created a demand for coke which already promises to overtake the available supply at no distant date. For these purposes, not soft coke, but gas coke of the hardest description, is required for efficient operation.

There are already some forty British firms specializing in the manufacture of coke-burning domestic heating appliances; and the potential outlet for coke in this direction, and for steam raising, may be gauged by the fact that the annual coal consumption for domestic purposes in this country is estimated at 35,000,000 tons, and that for steam raising, 60,000,000 tons.

Another factor which has in the past influenced the conduct of the gas-supply industry is the necessity for producing a non-friable coke that would bear handling without undue breakage. This consideration will continue to have an important bearing in the selection of strongly-coking coal that will, by itself, or blended with coals of other descriptions, produce a saleable coke; but it must be borne in mind that for use on mechanical stokers such coke must be cut or graded down to nut size. In order, therefore, to cater for the requirements of power stations equipped with coke-burning mechanical stokers, relatively cheap non-coking coal, which has hitherto been considered unsuitable, might profitably be used at gas-works, or for certain sections of gas-works, with a view to produce a friable coke or breeze that will not require cutting or grading. Such coal could not, of course, be used alone in horizontal retorts or in coke ovens, but the vertical retort should facilitate its use and thus tend to economize coking coal, which of all our mineral resources is perhaps the most precious.

Sufficient has been said to show that the use of coke as fuel is closely associated with the whole question of national economy. Its advantages as fuel for steam raising are now widely recognized. In ordinary boiler practice, its chief advantage, apart from its smokeless characteristic, is that it burns completely, without pulverizing or other treatment, with a minimum excess of air, whereas, in ordinary practice, bituminous coal is unavoidably allowed a quantity greatly in excess of that theoretically necessary. Coke gives therefore a correspondingly high temperature head and radiant effect.

Economic results obtained in ordinary hand-fired boiler practice at London public institutions, factories, and power stations, are such that coke of average quality more than holds its own in the estimation of discriminating steam users. Indeed, in many districts, the available supply is now unequal to the demand.

This result has been achieved after only a comparatively short period of intensive propaganda in popularizing coke as an industrial and domestic fuel. The impetus thus given to the movement should be sufficient eventually to absorb very large quantities of coke, and, moreover, to indicate the probable trend of future development in gas-works practice.

For use at power stations equipped with coke-burning mechanical stokers, coke breeze or coke of a friable nature is preferable. Such coke-burning mechanical stokers have recently been developed and perfected; and the ordinary natural-draught chain-grate mechanical stoker has been adapted successfully to burn low-grade coal and coke by means of the sandwich system. The potential outlook for coke in this direction is further instanced by the fact that by means of the sandwich system one London power station alone has, since 1918, consumed coke at the rate of 40,000 tons per annum, a quantity equal to about half its total fuel requirements.

The paper concludes with the results of independent comparative tests with coal, and with coal and coke, fired by hand and on the sandwich system, obtained from an important London power station.

THE EVENING STAR LODGE.

[COMMUNICATED.]

For the purpose of affording an opportunity for the members of the Institution of Gas Engineers who are Freemasons to meet on the eve of the Annual Meeting of the Institution, the Evening Star Lodge, true to its traditions, arranged to hold an emergency meeting on Monday, June 23.

It took place in the Grand Temple of Freemasons' Hall, Great Queen Street, London, and was attended by over two hundred brethren, including many distinguished in the London area and Provincial districts.

A warm welcome was given to Bro. Samuel Tagg, the President of the Institution; to W.Bro. Col. Eunson, of Northampton, who has just been elevated to Grand Lodge rank; and also to W.Bro. W. A. Surridge, P.A.G.D., a Past Master of the Lodge.

The meeting was very ably presided over by W. Bro. Rae P. Normand, who in the ceremony of the initiation of Mr. Clifford King, son of the late W.Bro. Walter King, was efficiently assisted by Bros. H. L. Sheppard, S.W.; A. H. Henry, J.W.; F. Cockey, S.D.; W.Bro. A. L. Croager, J.D.; and Bro. J. G. Bartholomew, I.G. W.Bro. Arthur Valon, P.M., one of the oldest friends of the late W.Bro. King, also took an important part.

It should be added that the Organist of the Lodge, Bro. J. F. Simmance, while the brethren were assembling, and at the close of the lodge, rendered selections, in which his musical abilities were beautifully exhibited.

Subsequently in the adjoining Connaught Rooms, the guests of the Lodge were entertained to dinner, and afterwards enjoyed a particularly excellent programme of vocal, instrumental, and other selections, under the direction of W.Bro. Townsend.

Owing to the special character of the occasion, the usual masonic toasts were dispensed with. After "The King" had been honoured, that of "The Grand Officers Present and Past," was given from the chair, and was eloquently responded to by W.Bro. Eunson and W.Bro. Sir Ryland Adkins, K.C. The latter cordially advocated the idea of "class" lodges such as legal, military, college, and school lodges, and the Evening Star. He held that it was distinctly good that men engaged during the day possibly as keen business competitors should have the chance of meeting under the beneficent ægis of freemasonry.

To W.Bro. Jacques Abady, P.M., L.R., was entrusted the toast of the evening. In a most impressive manner he spoke of the serious step which had been taken by the initiate of the evening, and referred to the special gratification felt by the brethren of the lodge in welcoming into their fraternity the son of one whose memory they would ever hold dear. The initiate made a brief and modest reply of marked sincerity.

"The Visiting Brethren" was proposed by W.Bro. Fred West, P.M., and was replied to by Bro. Tagg, as President of the Institution; by the respective Masters of the Northern Star (W.Bro. Ernest West) and Murdoch Lodges (W.Bro. Milbourne); and W.Bro. Blair, L.R.

The reception of the toast of the "Worshipful Master," given by the I.P.M., W.Bro. Frank West, indicated the esteem and regard in which W.Bro. Normand is held, not only by the brethren of his lodge but in a much wider circle of friends and acquaintances. After his response, it was announced that the circulation of the charity box had resulted in the collection of the sum of £13 10s. 3d., and that it had been decided to present it as a donation to the Benevolent Fund of the Institution of Gas Engineers, a kindly thought which Bro. Tagg, as Chairman of the Committee of Management of the Fund, in his response to the toast of "The Visiting Brethren," did not fail to acknowledge.

It was late when the party broke up, and many were the expressions of appreciation of the working of the lodge, and of the hospitality and entertainment which were subsequently offered.

DESCRIPTION OF A NEW HORIZONTAL SETTING.

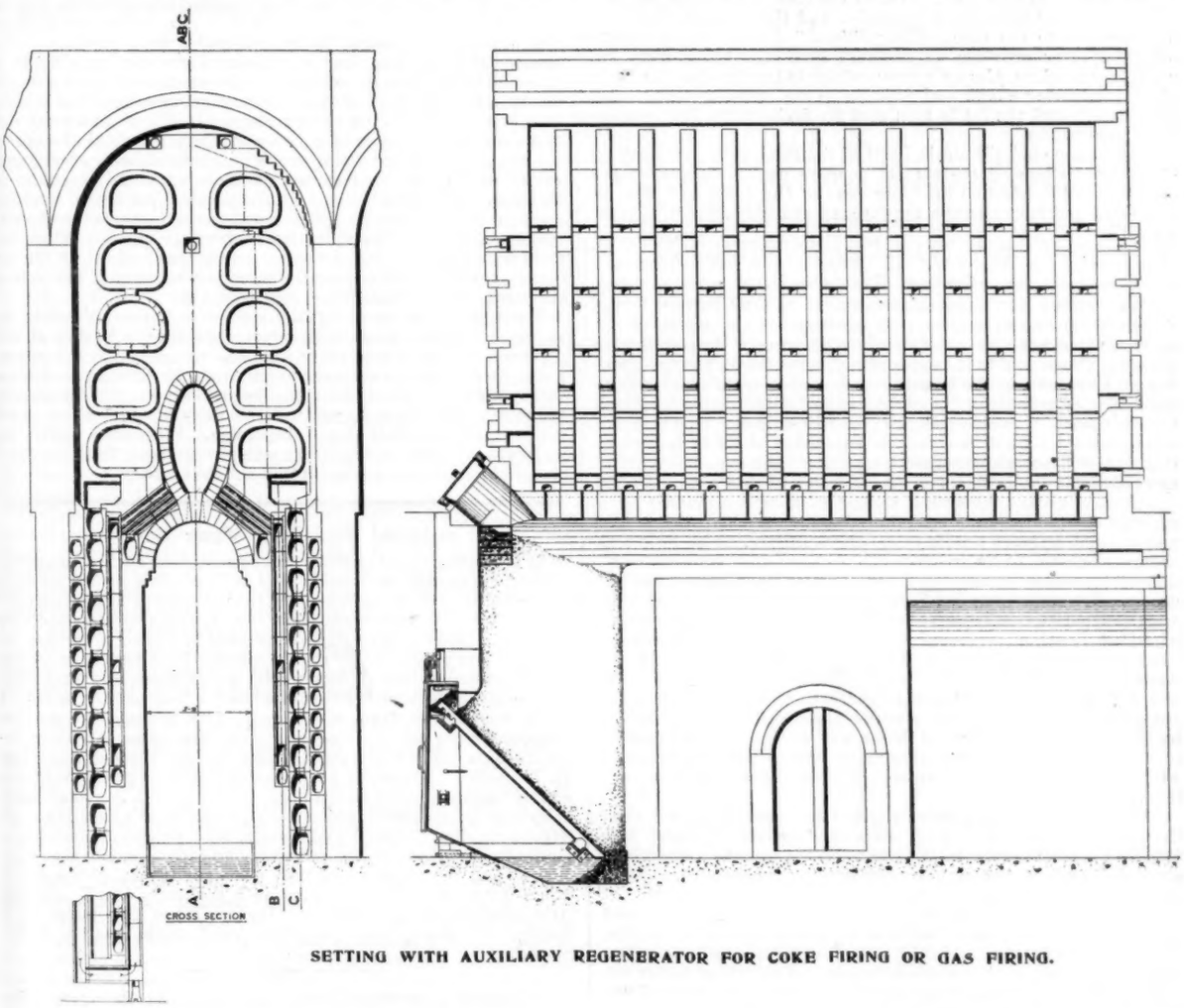
Robert Dempster Sons, Ltd., Elland.

The horizontal setting of to-day is very different from that of even a few years ago. Though to the outward eye the general design may appear to have altered little, the improvements which have been made in almost every detail are vast and remarkable. It is for this reason that the horizontal setting still holds its own in modern gas-works practice, and that in many cases where other plant has been installed ground space rather than thoughts of increased efficiency has been the ruling factor in the decision. The new construction of horizontal setting, which is the outcome of great experience and intensive study on the part of Messrs. Robert Dempster & Sons, Ltd., of Elland, typifies this statement; and the following description of their latest plant will be of more than passing interest to gas engineers, for the setting embodies features which make it unusually flexible and capable of meeting future contingencies in the event of a more widespread use of smokeless fuel.

INCREASED FLEXIBILITY OF FIRING WITH SOLID OR GASEOUS FUEL AT OPTION.

This patented feature, the outcome of collaboration between the Gas Engineer at Stretford, Mr. Wm. Carr, and Mr. Toogood, of Messrs. Dempster, represents a marked advance in horizontal retorting, and has for its object the supply of cheap therms of gas. Briefly, this departure from accepted practice is the combination with a coke-fired producer of an auxiliary regenerator in such manner as to fire the setting either by coke, coal gas, or external producer gas. When coke-firing, the auxiliary regenerator is utilized for extra regeneration for the preheating of secondary air. When gas firing, this auxiliary regenerator preheats the gaseous fuel, whence there is no idle plant at any time. The change-over can be made speedily without loss of heat in the setting. This allows great flexibility in working. The present market for coke is so good that many water-gas plants are idle, while retort-houses are correspondingly more fully employed; thus illustrating the power of the bye-products of carbonization, especially coke, in the production of cheap therms of gas. The sale of gas by the therm entails the maintenance of greater constancy of both quality and specific gravity, which features tend to the inadvisability of mixing with the coal gas largely fluctuating percentages of water gas. Again, immediate sales of coke as yielded produce the best financial returns. Further, the load factor in many gas-works, even yet, entails the lying-off of beds during summer months, to the increase of cost of production. The operation of these factors collectively produces such a condition that at certain periods of the year it would obviously be cheaper to heat by coal-gas and sell the coke, and thus get within the gas-works the collateral advantages of gaseous fuel—*i.e.*, its attendant benefits to the refractories and ease of control, the moral effect in being able to demonstrate to possibly new consumers the advantages of coal-gas fuel in large-scale application to furnaces.

Let us examine the problem a little more closely: Assume a change is made from coke-firing to coal-gas firing; there will be for a given gas requirement of the town, then, an increase of coke for sale of 25 p.c. previously gasified on fires, and 40 p.c. due to increased coal throughput to produce the heating gas—a total of 65 p.c. more coke for sale. Similarly, the tar and ammonia yields will rise by 40 p.c., so that it is expected to put gas into holder at od. per therm. The main advantage perhaps is the power placed in the hands of the gas engineer (a 65 p.c. controlling interest in his chief bye-product, coke), for as soon as coke sales showed signs of weakening, he could, without any difficulty or expenditure, gradually pass any setting on to coke-firing, and thus, by regulating the supply, to a large extent maintain the demand and prevent the accumulation of coke stacks and attendant losses.



SETTING WITH AUXILIARY REGENERATOR FOR COKE FIRING OR GAS FIRING.

In addition to the above flexibility of working, Dempsters have also initiated in their standard setting several recent improvements, which are shown in the drawing herewith.

THE "ELLAND" NON-CLINKERING SCREEN-BAR GRATE.

There are over seventy of these grates working, and their adoption means that the labour of clinkering the fires is totally obviated. The effect of this grate on the coke under gasification is remarkable, as the coke is retained in open formation, whereby a constant supply of producer-gas of even and good quality is supplied to maintain the desired constant high carbonizing temperatures. The grate is characterized by the total omission of any shelves or flat places (such as are found in step-grates) whereby coke can come to rest and agglomerate. Instead, the grate is a steeply-inclined bar-screen over all the pro-

ducer area, which, owing to all furnace linings being perpendicular, actually carries 100 p.ct. of the incandescent coke, so that each cob of coke as it descends must reach the screen, down which it creeps or gravitates as gasification proceeds. Since clinkers form only in the zone of primary combustion, and this grate has overcome the coke agglomeration, this zone is retained nearer the screen, so that as the carbon of the coke gasifies in this primary zone, the residue dust drops from the screen before it can flux. Mechanically the grate is designed to facilitate the stoker's work and prevent loss of usable coke in the pan-ash. To this end the bars are grooved to distribute water uniformly over all the grate area. The bars are pivoted, so that each can be rocked to break-up the fire with minimum effort and maximum dispatch. The bars are held in grooves to maintain the small screen mesh, whence, there being no sideways movement, usable coke cannot escape to the ashpan.

Sliding Ashpan Doors.

Though the screen-bar grates work at level gauge, and could in consequence work with open doors, or no ashpan, doors are fitted, as by their use an invisible blanket of vapour is retained equally over all the grate area, which feature, with open doors, would not be possible. The doors are mounted to slide laterally; thus the inner hot side of the door is never turned towards the stoker, but he can slide the door gradually across the fire and clean each bar while he shields himself from the heat.

A leaky charging door is against the good working of the producer, detrimental to the refractories and the ironwork, and uncomfortable to the men. The "Elland" doubly-sealed furnace charging door provides an ordinary type of inclined metal-to-metal sealed door, *plus* an annulus which is (optionally) filled with dust, thus giving a dust seal addition to the metal-to-metal joint. The interior of the lid is insulated by firebrick or light porous insulating bricks.

The furnace is built out in front of the setting, by which means the hot coke leaving the retorts is more easily charged to the furnace, and in addition the inner face of the front wall can be inspected and cleaned from the furnace charging door with great ease.

Producer and Combustion-Chamber Arches with Common Keystone.

The stability of the producer arch is a vital feature in the design of retort settings, for it is subjected to the action of fire on its underside, to the weight and temperature of the combustion chamber above, and to the expansion strains thrown by the highly-heated brickwork of the combustion-chamber arches and setting generally. Carbonizing temperatures to-day are often maintained at over 1400° C. To withstand these temperatures, 95 p.ct. silica refractories are used; and as the expansion of silica is greater than that of firebrick, increased temperature and expansion render more difficult the problem of the stability of this arch. In the new form of setting the arch is reinforced in such a manner as to provide a superimposed or inverted buttress where the weight and expansive forces are likely to cause failure. The producer arch is surmounted by an elliptical arch, so that practically no dimension exists between the legs of the combustion-chamber arches. By combining the keystones of both the producer arch and the superimposed series of combustion arches, the advantages of added strength, increased stability, and ability to withstand expansion strains are obtained. Also, the full visibility of the nostrils is maintained. This construction enables the elliptical and bull-nosed combustion-chamber arches to be designed as complete ellipses of the fullest major and minor axes permissible by the particular grouping of the retorts, and of such a shape as to accommodate the combustion flame issuing from the nostrils, with a minimum of impingement of both flame and dust particles.

To enable the upward expansion to take place on an even keel, the stay walls are of 95 p.ct. silica throughout. To keep uniformity of retort segments, all stay walls are thinned and equally pitched. This, moreover, uncovers a large proportion of retort walls for ready heat penetration.

The 95 p.ct. silica retorts are built-up from grooved and tongued specials, few in variety, and small in bulk, whereby the conversion of silica is well pronounced in manufacture and kilning. The mouthpiece ends of retorts are of fireclay, to withstand better the sudden change of temperature on the opening and closing of the self-sealing mouthpiece lids.

The retorts have $\frac{3}{16}$-in. clay joints between the segments within the stay walls, so that the expansion of silica segments squeezes some clay out of these covered joints. The upward lift of the stay walls is accommodated by the clearance left under the crown of the main arch, as shown. The stay walls are built with a yielding edge against the pier walls. This is formed by building a toothed edge to the wall, the projecting teeth being always in contact with the pier wall. Behind each tooth is a space, so that as the silica grows, the teeth push into their sockets, and while always giving support to the retorts, automatically and exactly allow for the heat changes in the silica.

Insulation of the Setting.

The insulation of the bench walls has received close investigation. It is common practice to build the insulating material within cavities formed in the walls themselves. Thus, what is gained by insulation is apt to be lost by extra atmospheric infiltration, for a cavity wall cannot remain as strong to resist the expansion strains of a setting, and yet be as tight, as a solid and properly bonded wall. The improvement which Messrs. Dempster have effected consists in retaining these most substantially built walls, having projecting headers, to which (after the heats are up and the expansion strains and movements are over, the hot walls being whitewashed to reduce permeability) an additional 4½ in. thickness of insulating porous brick is built. So efficient is this method that the hand can be placed and retained on the walls of a combustion chamber at a temperature of 2550° Fahr.

Tubular Regenerator.

This improved regenerator, it will be observed, in the striving for efficiency of heating the incoming air to the maximum degree, occupies the fullest depth and width of the heated brickwork available. Its strength is assured by its cellular or tubular construction, and also by the tubes being staggered to break joint in every direction, and adjacent groups of tubes having their axes at right angles. Its air-tightness is accomplished by the tubes being machine-made and of close texture material, and also by the double partition forming the divide between the descending waste heat and ascending secondary air; any crack which might develop in one tube being covered by the sound portion of the adjacent tube. The efficiency of heat interchange is assisted by the thinness of the divide, and by the large air capacity of the regenerator, which increases considerably the time the stream of air is contained within the heated tubes. The ability to work at pressure is augmented by the increased depth of rarefied air within the regenerator, which, by its natural tendency to rise, enters the combustion chamber even when the latter is under slight pressure. The accumulation of flue dust is prevented by the smoothness of the machine-made walls of tubes. The waste-heat tubes are sufficiently large to permit of ready inspection, clearing, or of passing up a brush or paddle to effect repairs. It will be observed that there are but two sizes of tubes, and there is a total absence of the many and various tiles usually associated with regenerator work, thereby assuring tight work and economy and expedition in building. The control dampers are situated just within the front walls, in a cool position where they can be inspected and more exactly operated. There are eight secondary-air inlet slides, and eight waste-heat control dampers; so that each eighth of the setting is governed independently, whence a mastery of the setting temperature is in the fullest degree provided.

From the foregoing it will be seen that horizontal-retort designers are fully alive as to their responsibilities in aiming at still higher efficiencies in respect of what has been generally considered a standard piece of gas-works apparatus. It will also be evident that relatively to distributing the therms in coke, the distribution of therms in gas is dear; and to retain this difference on the credit side is a commendable aim of the design. With such inspiration we venture to predict that there will always be a field for horizontals in many gas-works throughout the country.

Liquid Fuel from Water Gas.

As indicating that the problem of converting carbon monoxide into products capable of utilization as liquid fuels is attracting a good deal of attention in Germany, the "Chemical Trade Journal" states that it is understood that the chemists of the Badische Anilin und Soda Fabrik have succeeded in finding a method for the synthetic production of methyl alcohol from carbon monoxide which possesses distinct commercial possibilities, and that Herr F. Fischer, of Mulheim, has worked-out a process for making a liquid fuel direct from water gas. This process—to the fuel produced from which has been given the name "Synthol"—has been patented in the joint names of Herr Fischer and Herr H. Tropsch. The water gas is submitted to a pressure of 150 atmospheres and a temperature of 400° to 450° C. in an autoclave of special construction, and in the presence of a catalytic material consisting of iron borings coated with potassium carbonate. Under the influence of the catalysts, the carbon monoxide is reduced; and the products formed, when condensed, give a liquid, which separates into two layers—a relatively small aqueous layer, and a preponderating oily layer. When this latter oil is distilled in steam, the distillate, freed from water, forms "Synthol."

Southern Association of Gas Engineers and Managers.—The next meeting of the Eastern District of the Association will take place at the Institution of Gas Engineers, No. 28, Grosvenor Gardens, S.W.1, on Tuesday, July 15, at 12 o'clock. The meeting will be followed by a visit to H.M. Fuel Research Station at East Greenwich.

The Life of Silica and Fireclay Retorts.—In the review of the Proceedings at the Annual Meeting of the Institution of Gas Engineers, in the remarks on the discussion of Mr. Emery's paper on "Silica Gas Retorts," it was mentioned (*ante* p. 70) that at Beckton it had been proved that silica retorts have a longer life than those made of fireclay. From the wording of our remarks, it would be assumed that Mr. Leech had had silica retorts at Beckton giving a life of 4000 days. As a matter of fact, Mr. Leech, in giving this figure, was referring to an installation of silica retorts on the Continent. With regard to the average life of fireclay retorts at Beckton (500 days), it must be understood that this relates to retorts worked at heats in the neighbourhood of 1400° C.

ALKALI WORKS CHIEF INSPECTOR'S REPORT.

Reporting to the Minister of Health on the proceedings during the year 1923, Dr. T. Lewis Bailey, Chief Inspector under the Alkali, &c., Works Regulation Act of 1906, states that the total number of works registered was 1219, which entailed the inspection of 1995 separate processes. Compared with the previous year, this is a reduction of 21 in the number of works, and of 10 in the number of processes. The number of visits of inspection to registered works during the year was 3924, in the course of which 2630 quantitative estimations were made of the noxious constituents of chimney and other gases escaping from the processes in operation. In several quarters the rapid growth of petroleum refineries has been a source of nuisance, owing to the fact that the waste gases escaping from the distillation of crude petroleum were permitted to pass directly into the atmosphere. It has been found possible to get these gases (which have a considerable calorific value) trapped and made use of, with advantage to both the surrounding neighbourhood and the manufacturer. Again, excessive smoke from coke-ovens has received attention at the hands of the Department, and amelioration of the smoke nuisance due to this has been attained by the dissemination of information regarding the possibilities of auxiliary flues, and by the practical experience of the staff in such matters. Complaints of nuisance against registered works have not been excessively numerous. Six works were found operating without having been registered before commencement.

Sulphuric Acid Works.

There has been a further increased replacement of pyrites by sulphur as raw material for the production of sulphuric acid. New types of sulphur burners are making their appearance, and the use of mechanical burners for sulphur is extending. The design of acid-making plant, too, continues to give inventors an opportunity for exercising their ingenuity. Newer types of plant are being designed with a view to reducing capital cost; and types of plant are coming to the fore in which "variations in the sulphur dioxide content of the initial gases do not have the baneful effect that they do in the existing forms of chamber plant." In the report for the previous year it was remarked that leakage of sulphur dioxide at the point of entry of the burner pipe into the Glover tower is frequently a source of annoyance; and it was noted that a water-jacketed collar, burnt on to the side of the tower, had with great advantage been used for some time at one works. This collar, it is now reported, continues to give the success that was anticipated, and its use has been extended. During the year one more works has adopted electrostatic deposition of dust in connection with a chamber plant. The installation has accomplished what was hoped for, in providing a perfectly clear Glover acid. Generally speaking, plant maintenance has been very satisfactory, and control of operations has on the whole been good.

As to contact processes, attention has been drawn in previous annual reports to the excessive acidity of exit gases from Grillo plants. The Department have pressed for the installation of scrubbers, fed with soda ash solution, at the end of the system, and at two works such scrubbers have been operated during the past year with gratifying results from all points of view. The total acidity of the escaping gases is now equivalent to less than 1 grain of SO_3 per c.ft., and a high-strength bisulphite is made. The introduction of the electrostatic method of dust deposition in connection with contact plants has proved its worth.

Sulphate of Ammonia and Gas Liquor Works.

While remarking that, on the whole, operations in sulphate of ammonia and gas liquor works have been conducted without offence, Dr. Bailey says, at several works in the Eastern Midlands purifiers have been allowed to get into poor order. Either the purifiers were too small for the purposes for which they were intended, or, where walled purifiers were employed, the joints of the brickwork had become leaky. Where the existing ones were too small, larger purifiers have been installed, and walled purifiers have been transformed into heap purifiers, with consequent improved working in both cases. At one works in the North of England, where only one heap was provided, the heap was so badly fouled during a run of the plant that removal of the oxide was found to have taken place while the plant was still operating. This, he points out, is not only contrary to the requirements of the Act, but is highly dangerous. As the result of a warning, provision for better absorption was promptly made by the installation of an additional heap. A similar warning was found necessary in the case of another works, where the purification system has now been entirely remodelled.

Treatment of Effluent Spent Liquors from the Distillation of Ammoniacal Liquor.

The following statement on this subject is extracted from Dr. Bailey's report.

The work of investigation, which has been proceeding during the past two years with a view to finding an efficient and practicable method of treating the effluent from sulphate of ammonia and gas liquor plants, has taken on a somewhat different aspect. The original dephenolating towers, which we got erected at the Hornsey Gas-Works, continue to do good work, although it has not been possible, so far, to introduce there the use of fans, as advocated in the report for 1921. This method of effecting the passage of the fire-gases through the towers, instead of using a steam injector, will shortly be applied at another works. Calculation shows, however, that the heat brought in by the relatively dry fire-gases at (say) 350° to 400° C. is insufficient to maintain the temperature required for maximum efficiency (85° to 90° C.) in view of the large amount of heat leaving the tower in the exit gases. Radiation and conduction losses, moreover, are necessarily high in a scrubber working at a temperature approaching that of boiling water. Additional heat is needed, and this will be supplied by waste steam admitted with the fire-gases. Various types of tower packing are in use at different works.

Difficulty has been experienced at one works owing to the unusual amount of free lime contained in the spent liquor from the ammonia still. There was rapid deposition of calcium carbonate on the scrubber packing, although this was an open type of packing frequently employed in chemical works. Passage of gases quickly became unduly obstructed. This difficulty has been successfully overcome by blowing the hot liquor with a certain amount of fire-gases at the point of entry to the settling pits. Precipitation of the excess lime here has the further advantage of promoting the coagulation and removal, in the settling pits, of something like 50 p.ct. of the colouring matter due to higher tar acids, which would not be volatile in the towers. In laboratory experiments the addition of a small quantity of alumino-ferric solution to the hot liquor, after treatment with waste gases containing carbon dioxide, is found to promote clarification, and its use is now under investigation.

The spent liquor to be dealt with at Hornsey is a horizontal retort liquor, having an oxygen absorption figure of about 300 per 100,000. When we came to deal with spent liquors of vertical retort origin, however, very different conditions were found to exist; oxygen absorption figures were very much higher—usually 600 to 800 parts per 100,000. Moreover, the phenol, thiocyanate, and thiosulphate content was much higher than in horizontal retort liquors generally. It was noticed, too, that the residue in the distillation flask in the laboratory experiments remained very strongly coloured.

In the case of horizontal retort liquors, it was found possible to calculate approximately the oxygen absorption figure from the composition of the liquor; but in the case of vertical retort liquors, such calculation invariably gave considerably lower figures than were obtained by actual experiment. This suggested the presence, in the vertical liquors, of other oxidizable bodies, which did not volatilize on distillation; and the behaviour as regards colour with reagents (hydrogen peroxide, ferric chloride, and sodium hydrate) pointed to the presence of higher phenoloid bodies, such as di-hydric and tri-hydric phenols. Confirmation of this view is forthcoming by the publication of the researches of G. S. Currey, of the Mortlake Gas-Works, Sydney. ("J. Soc. Chem. Ind.," 1923, T. 379). Currey actually isolated catechol from the mixed phenols in the ammoniacal liquor, the presence of other polyhydric phenols being inferred.

Thus, in the case of vertical retort liquors, although good removal of mono-hydric phenols may have been effected in the dephenolating towers, there still remain polyhydric phenols, undesirable (*a*) by reason of their strong colouring properties, developed when the solution becomes faintly alkaline, as it does on mixing with a sufficient volume of hard water, and (*b*) by reason of their oxygen-absorbing property.

But, in addition, analyses of vertical retort effluents showed a high content of thiocyanate and thiosulphate, which further complicates the question of effluent treatment and disposal. The treatment of such liquors by dephenolation is manifestly insufficient, and, in the light of present knowledge, to follow this by complex biological treatment would appear to be of doubtful practicability, at any rate in the case of gas-works, if only by reason of the ground space required.

At the same time, it must not be forgotten that town sewage, mixed with ammonia plant effluent, can be quite well dealt with by treatment on the land, if the relative amount of such effluent is small and reasonably constant. There exist in the soil bacteria capable of decomposing phenol, ortho-, meta- and para-cresol, naphthalene, &c., sulphides, and thiosulphates. ("Micro-organisms of the Soil," by Sir J. Russell and others, pp. 31, 37, 178.)

Recently Dr. Maclean Wilson and Mr. W. J. Read, of the West Riding of Yorkshire Rivers Board, have carried out an investigation on the treatment of these waste-liquors on a matured percolating filter. Their experiments indicate:

(1) That a spent gas-liquor, diluted until the oxygen absorbed in four hours is 400 parts per 100,000, is amenable to biological treatment.

(2) That one filtration of this liquor at the rate of 15 gallons per cubic yard per day of eight hours reduces the oxygen absorbed by 90 to 95 p.ct., and removes 95 p.ct. of the thiocyanate, yielding a highly nitrated effluent (at times containing as much as 10 parts of nitric nitrogen per 100,000).

(3) A further filtration of this effluent on a similar filter at the rate of 12 gallons per cubic yard per day of eight hours gives an effluent free from thiocyanate and absorbing less than 2 parts of dissolved oxygen per 100,000.

We have ourselves done an amount of laboratory work in this direction during the past year. [This will be detailed later in the "JOURNAL," as an article in continuation of that on p. 256 of Vol. 163.] The results so far obtained open-up a large field.

In view of what has been said above regarding the difficulties

attending biological treatment of highly polluted effluents of this class, our attention was directed to a detailed study of the methods of condensation and storage of ammoniacal liquors prevailing in gas-works practice, with a view to ascertaining whether the methods usually employed are the best possible, or whether modifications are desirable, and at the same time practicable, which would have the effect of producing an ammoniacal liquor of considerably lower oxygen-absorbing property—in other words, whether it is possible by simple modifications to reduce the amount of thiocyanate, thiosulphate, and polyhydric phenols in the ammoniacal liquor to be distilled, without at the same time depreciating the quality of the coal gas or lessening the amount of ammonia recovered per ton of coal carbonized. These points are discussed in the article mentioned above. The subject appears to be one that merits still further consideration by gas-works engineers and chemists.

Fractional separation of the bulk of the tar in the crude gas at the hot end of the system, if it is possible to effect this in the case of vertical retort systems where a dry gas-main exists, also separation of tar and condensed liquor, as far as may be, throughout the plant, should effect a notable reduction in the phenol and higher tar-acid content of the liquor. We are thus led independently to the conclusions reached by Field (*see* Lunge's "Coal Tar and Ammonia," 4th Edition, Vol. II., p. 882). His procedure was directed to getting a better separation of tar and liquor, with the production of ammoniacal liquor richer in ammonia, but it should be equally effective in promoting the separation of an ammoniacal liquor less contaminated with higher tar acids.

The greater part of the thiocyanate and thiosulphate present in ammoniacal liquors is due to oxidation changes taking place when air is present. By minimizing air leakage at the retorts, and by the admission of air (in cases where such admission is favoured) at a point immediately before the purifiers, the formation of thiocyanate and thiosulphate would be minimized, and in this connection cyanide recovery becomes a further point for consideration.

Tar Works.

It is still found to be necessary to call attention to the poor state of pitch coolers at some works; and in one instance objection had to be raised to the excessive temperature at which the pitch was being run to the bays. "There is," the Chief Inspector says, "no need for the evolution of annoying amounts of noxious fumes when running pitch. With proper attention to the condition of the pitch coolers and to the running-off temperature, tar works should not be a source of nuisance in the surrounding neighbourhood."

Ammonia Products Manufactured in England and Wales (expressed as Sulphate, 25¾ p.ct. NH_3)—Tons.

From Liquor Produced in—	1923.	1922.	1921.
Gas-works	142,980	144,817	129,431
Iron-works	796	83	167
Shale-works	—	—	—
Coke-oven works	178,303	125,679	54,184
Producer-gas and carbonizing works (bone and coal)	5,917	4,722	4,446
Total	327,996	275,301	188,228

Note.—Of the total quantity of ammonia products, the equivalent of 32,780 tons was manufactured as concentrated ammoniacal liquor; the balance of 295,216 tons consisting of other ammonia products (sulphate, chloride, nitrate, &c.).

Tar Products Manufactured in the United Kingdom, 1923.

—	Gas and Coke Oven Works.	Other Works.
	Tons.	Tons.
Tar distilled	1,436,305	20,895
Pitch produced	578,456	9,362

Report for Scotland.

In the report which he has presented to the Scottish Board of Health, Mr. J. W. Young states that the number of works registered was 161, in which 303 scheduled processes were carried on—including 13 gas liquor, 109 sulphate and muriate of ammonia, and 58 tar plants. There were 521 visits to these works.

Ammonia Products, Tar Distilled, and Pitch Produced.

—	Salts of Ammonia.	Tar Distilled.	Pitch Produced.
	Tons.	Tons.	Tons.
From gas-works	24,587	132,018	38,630
,, iron-works	7,757	66,852	40,280
,, coke-ovens	8,307	17,920	7,555
,, producer-gas	6,260	8,178	3,079
,, shale-works	50,683	—	—
Total, 1923	97,594	224,968	89,544
In 1922	75,841	173,171	61,353

The ammonia is expressed as pure sulphate, but 6291 tons were obtained as concentrated liquor ammonia, and 530 tons as ammonium chloride. Of the tar, 90,000 tons were partially distilled to "prepared tar" for road material, without production of pitch.

With regard to sulphuric acid works, Mr. Young says manufacture from spent oxide has continued to increase, and now has reached one-seventh of the whole production. Plant has been maintained in good order, and prompt attention has been given to his suggestions, where necessary, of renewal. Two units have been fitted with the subsidiary process of continuous oxidation of gaseous ammonia as a source of nitrate supply. Results have been satisfactory, and the process has been easy of control.

Sulphate and Muriate of Ammonia and Gas Liquor Works.

These, more numerous and more active than any other class, afforded also more examples of neglect and incorrect control—in two cases so serious that legal process to inflict the penalties provided for infractions of the Act could have been fully justified. In the first case the condensed liquid—*i.e.*, the "devil liquor"—formed by the cooling of the foul gases evolved from the saturator of a sulphate of ammonia plant was allowed to escape freely into the air, notwithstanding previous warning. In the next, the range of cooling pipes for the foul gas had partly perished from old age, so that through many holes poisonous steam escaped. In both cases effective repairs were executed and promises given of more careful observance.

It has again been necessary to warn some managers to renew the oxide of their purifiers more frequently, and with adequate stock of material. The advantages of more even distribution of gas through the mass, and the greater ease of removal when foul, are better appreciated than formerly; and the idea that an annual clearance was enough is now abandoned.

The preparation of dry and neutral salt continues to increase, although farmers are sometimes reluctant to pay the price; and to manufacturers of manure, intending to blend with discoloured and acid bodies, such purity is, says Mr. Young, superfluous.

Tar Works.

Distillation of tar continues to extend faster than other scheduled processes. Where tar distillation is complete, trouble sometimes has arisen from the "coolers"—*i.e.*, the closed tanks wherein hot pitch remains to cool previous to flowing away to the pitch-bay. To avoid leakage, rivets on these coolers need constant supervision; neglect of this precaution caused two fires. Care is also required to arrest the displaced fumes while the hot pitch is run off from the still. The neighbours of one of the larger tar works suffered much annoyance from these fumes, until the present excellent system was installed. The pitch fumes are now drawn away from the cooler by a fan through a closed range of pipes, and wholly condensed to oil. Similar draughting of the hot tanks in which is mixed road material, containing pitch, is also of much benefit. It was noted that unless the draughting pipes are of ample size the system fails.

Two deaths were caused by a sudden rent in a charged still. Of eight stills set side by side in one block some were in action, including the seventh; the eighth was idle, and its setting was under repair, the bricklayers being at work within the flues surrounding the still. The metal plates of the seventh still gave way; its contents escaped and caught fire. The men were suffocated before they could reach safety. Such accidents are rare; but a rule forbidding repairs to a still so situated, unless the adjacent still is also idle, would probably have saved these two lives.

The report—the sixtieth of the series—is published by H.M. Stationery Office, Imperial House, Kingsway, W.C., and branches, at the price of 1s. 6d. net.

A New French Text-Book.

We have received from M. Dunod, of No. 92, rue Bonaparte, Paris, a copy of "Gaz et Cokes," a text book on the manufacture and utilization of town gas and other industrial gases, and of coke and the bye-products of coal, by MM. A. Grebel and H. Bouron. The editorial notice which accompanies the volume points out that the gas and coking industries are among those which have suffered the most complete transformation during and since the war. Beyond a few important treatises of use to engineers already possessing the highest theoretical and technical knowledge, there exist in France only three or four text-books of service to the management of small gas and coke-oven works; and the editions of these are to-day completely exhausted. MM. Grebel and Bouron thus fill the gap with their present work, which is characterized by an abundance of information and figures indispensable to gas engineers. The price of the book is frs. 72.50 in cloth, frs. 67.50 in paper—a modest sum for a volume of 700 pages with 67 tables and 324 illustrations. We hope to publish in an early issue a short review of the book.

On July 15, the Institute of Chemistry Students' Association will visit Wembley. Mr. W. J. U. Woolcock, C.B.E., General Organizer of the Chemical Section of the Exhibition, will explain the objects of the exhibits and the special features of interest.

INCLINED CHAMBER OVENS.

A highly interesting *brochure* has been prepared by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., dealing with inclined chamber ovens. This plant has of recent years become exceedingly popular on the Continent—a fact which is evident when it is mentioned that since 1906 no less than 62 installations have been constructed, and that Paris possesses a plant capable of producing 26,800,000 c.ft. of gas per 24 hours. Carbonization in bulk, as is well known, is attended by many advantages: Coal of any variety or size can be used without inconvenience in working—an important factor now that the use of slack in gas-works is becoming more general; labour costs are reduced to a minimum; the make of gas and residuals is at least equal to the best horizontal practice, and in addition the ovens can be efficiently steamed; the quality of the coke from poor coking coals is much improved; maintenance costs are low; the ground space occupied per ton of coal carbonized is less than in any other form of intermittent carbonization; and the time for charging 8 tons of coal is under half-a-minute, while discharging takes even less.

DESCRIPTION OF A PLANT.

The coal is delivered by means of an elevator to scraper conveyors feeding a central coal storage bunker placed above the chamber settings, and carried by the extension of joists forming a part of the chamber setting steelwork. This central storage bunker holds a supply of coal for 24 or 48 hours for the entire installation. The charging operation is performed by means of a travelling hopper holding the charge for one oven. This passes under the shoots of the main central bunker, and is fitted with an adjustable device which enables the weight of coal delivered to any particular chamber oven to be varied. The machine is either hand or electrically traversed. The coal-charging mouthpiece doors are all of the self-sealing type.

Prior to the discharge of any particular chamber, a coke-quenching machine is brought opposite the chamber. A hoisting motor then raises the oven door, and the incandescent coke slides out into the quencher machine, after which the oven door is lowered and closed. This operation requires about 20 seconds. In the action of raising and lowering the door, the fastening gear forming part of the door operates automatically. The eccentric closure is worked by heavy counterweights, and a pressure of about 20 tons is applied to the door sealing edges, thus rendering them gas-tight. At the top end of the ovens a starting machine is provided for starting the discharge of the ovens should there be any tendency to stick. This machine consists of a light structure in which is placed a light ram geared to an electric motor drive; the path of the ram being in a straight line following the angle of the chamber oven floor.

In large chambers of 8 to 10 tons capacity two 10-in. diameter offtakes are provided, or one 14-in. offtake, leading direct to a hydraulic main. Each chamber has its own independent hydraulic main and uptake gas main, which leads into a common gas-collector main for the whole battery of ovens. The hydraulic main is capable of being worked with a wet or dry seal, and is provided with cleaning doors and apron seals, thus enabling thick tar to be removed at any time. The tar flows from the hydraulic main as made, and only a liquor surface is maintained. Though little scurf is formed, scurfing is occasionally required. This is performed in half to three-quarters of an hour, and the flakes of carbon come off in large pieces. The flakes are discharged by a slide fixed to the coke quencher. Standard Woodall-Duckham producers are adopted for these installations.

WORKING RESULTS.

A normal yield of straight coal gas per ton of average gas coal is 15,000 c.ft. of a calorific value of 500 to 510 B.Th.U. per c.ft. —equivalent to 75 to 76 therms. The tar produced, which is practically free from paraffins, varies from 10 to 12 gallons according to the quality of the coal carbonized. The average yield of ammonium sulphate is approximately 28 lbs. per ton of coal, assuming that the latter has a nitrogen content of 1·2 p.ct. The quality of the coke is good, and, when broken, it makes an excellent domestic fuel. The ovens can be readily and efficiently steamed, and the fuel required for heating the ovens is less than is required for horizontal retorts. As to labour costs, these naturally vary with the size of the installation. For an inclined chamber oven plant of a capacity of 700 tons of coal daily, the labour costs approximate 5d. per ton; while for a plant dealing with 1000 tons daily, the figure is reduced to about 3d.

Gas v. Electricity for Street Lighting.—The "South Wales Daily Post" for July 3 says: "At Swansea recently there has been a little controversy over the merits of gas and electricity as illuminants. For street lighting, we are inclined to give gas the supremacy at present. Its clear whitish-green light is in most pleasing contrast to the dim yellowness that often overtakes electric globes. In some of the mining villages near Swansea the electric road lamps suggest the dimness of oil rather than an assumed vastly superior successor. Inside the house, the ease with which light and power can be switched on and off is a great asset of electricity, apart from other considerations."

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Institution Meeting.

SIR,—I enclose copies of letters sent by me as President of the Institution of Gas Engineers to the President of the Société Technique de l'Industrie du Gaz en France and to the Secretary of the Centenary Committee, to thank them and their members for their cordial welcome and generous hospitality upon the occasion of our memorable visit to Paris. These might perhaps interest your readers.

Permit me to offer you my hearty congratulations upon the issue of your brilliant Institution Number—a complete record of our annual general meeting, which proved to be one of the most successful gatherings. The gas industry is fortunate in being so well served by its Technical Press. For three-quarters of a century the "GAS JOURNAL" has maintained the best traditions of specialized journalism; and it is the wish of your numerous readers that as the gas industry flourishes, so may the "JOURNAL," which for so long a period has ably represented our industry.

J. FERGUSON BELL.

The Gables, Derby.
July 4, 1924.

M. Francis Rouland,
Président du Comité du Centenaire,
12, Rue de Clichy, Paris.

Monsieur,

Président de l'Institution of Gas Engineers, je vous remercie infiniment, au nom de la Société que je représente, de l'honneur que vous nous avez fait en nous invitant de venir nous associer à la cinquantième réunion de votre Société, et au Centenaire de l'Industrie du Gaz en France.

Nous avons été très touchés de l'hospitalité cordiale qui a été offerte aux membres anglais du congrès. J'ose espérer que l'Entente Cordiale sera raffermie par d'autres échanges de visites de ce genre.

Tous ceux que ont eu la bonne fortune de pouvoir accepter l'invitation bienveillante de votre Société garderont longtemps les souvenirs les plus agréables de leur séjour dans la ville merveilleuse de Paris, et de leurs visites à Douai et à St. Quentin.

J'espère, M. le Président, que l'Industrie du Gaz en France continuera à jouer du succès qu'elle a eu jusqu'ici; et en vous remerciant encore une fois je vous prie d'agréer l'expression de mes sentiments les plus cordiaux.

J. Ferguson Bell
(President, Institution of Gas Engineers).

[TRANSLATION.]

SIR,—As President of the Institution of Gas Engineers, I should like to thank you exceedingly on behalf of our Society for the honour you have done us in inviting us to be present at the fiftieth anniversary of your Society and centenary of the introduction of gas in France.

We have been much impressed by the cordial hospitality which was given to the English members at the Congress, and I dare to hope that the Entente Cordiale will be strengthened by this and the exchange of other visits of this kind.

All those who were fortunate enough to be able to accept the very kind invitation of your Society will have for a long time the pleasantest memories of their visit to the beautiful City of Paris, and of their visits to Douai and St. Quentin.

I hope, M. le Président, that the gas industry in France will continue to enjoy the success which it has had up to the present; and in thanking you once again, I ask you to accept my kindest regards.

M. P. Mougin,
Secrétaire-Général, Comité du Centenaire.

Monsieur,

Je tiens à vous offrir nos remerciements les plus cordiaux de tout ce que vous avez fait pour l'agrément et le confort de nos membres pendant leur séjour à Paris à l'occasion du congrès du Centenaire de l'Industrie du Gaz en France.

Les arrangements que vous avez faits ont contribué beaucoup au succès de notre visite. Nous nous rappelerons longtemps l'hospitalité généreuse que nous avons reçue à Paris, à Douai, et à St. Quentin.

Les préparatifs qu'il vous a fallu faire pour tant de personnes ont dû vous coûter beaucoup, et en temps et en énergie, mais vous devez maintenant être satisfait par le succès si complet de tous les arrangements que vous avez faits. Tout le monde est rentré en Angleterre avec les souvenirs les plus agréables de la visite.

Je vous prie, Monsieur, d'accepter avec mes remerciements les plus cordiaux l'expression de mes sentiments bien distingués.

J. Ferguson Bell
(President, Institution of Gas Engineers).

[TRANSLATION.]

SIR,—I beg to offer you my most cordial thanks for all you have done for the pleasure and comfort of our members during their stay in Paris on the occasion of the Centenary Congress.

The arrangements you made contributed greatly to the success of our visit. For a long time we shall recall the generous hospitality which we received in Paris, Douai, and St. Quentin.

The preparations necessary for so many people must have cost you much time and labour, but you will be satisfied with so absolute a

success of all those arrangements which you made. Everybody returned to England with the most agreeable memories of their visit.

I ask you, Sir, to accept with my most cordial thanks my kindest regards.

The Retorts at Keighley.

SIR,—On p. 70 of your issue for July 2, you allude to the reference in Mr. Emery's paper before the Institution of Gas Engineers to the remarkable success of the fireclay retorts (Drake's setting) at Keighley, and in another paragraph on the same page you say that Mr. G. M. Gill "had examined the retorts at the Keighley Works, and they are built of siliceous material."

As the makers of the retorts in question, we desire to correct any erroneous impression which may have been created by the latter statement. These retorts were fireclay retorts, made without any addition of silica.

H. J. C. JOHNSTON,
Director.

The Leeds Fireclay Company, Ltd., Wortley, Leeds, July 4, 1924.

Therms per Ton—A Correction.

SIR,—I should like to congratulate the "JOURNAL" on the general excellence of its report of the Institution proceedings. There is one correction that should be made, however. I am reported to have said "I agree that 80 therms per ton is a very high figure. It is an average over 18 months; frequently we went much higher, and, of course, we went much lower."

It should read as follows: "I agree that 80 therms per ton is a very high figure; but the average over 18 months was 73·48 therms per ton; frequently we went much higher, and of course we went lower." I shall be obliged if you will make this correction in your next issue.

R. E. GIBSON.

Gas Offices, Liverpool, July 5, 1924.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Companies Amendment (Co-partnership) Bill: The House to be in Committee on Tuesday, the 15th inst.

Rhymney and Aber Gas Bill: Reported from the Select Committee, with amendments; read a third time, and passed; sent to the Commons.

Rotherham Corporation Bill: The further Standing Orders have been complied with; read a second time, and committed.

HOUSE OF COMMONS.

Progress of Bills.

Rhymney and Aber Gas Bill: Read the first time, and referred to the Examiners.

Gas Regulation Act.

A copy was presented of the draft of a Special Order proposed to be made by the Board of Trade under section 10 of the Act, on the application of the Watford Gas and Coke Company.

The Draft Special Orders under section 10 of the Act relating to the applications of the Burton-on-Trent Corporation, Harpenden District Gas Company, Skipton Urban District Council, and the Walsall Corporation were approved last Wednesday on the motion of Lord Muir Mackenzie.

Public Utility Companies (Capital Issues) Act, 1920.

A report was presented on an application by the Tawe Valley Gas Company to the Board of Trade under the Act.

WEST THURROCK WHARF AND RAILWAYS BILL.

Grays and Tilbury Gas Company's Opposition.

An interesting point with regard to the manufacture of gas by other than gas undertakers arose in connection with the above Bill. The Bill sought powers to incorporate the West Thurrock Wharf and Railways Company for the purpose of constructing a large wharf on the Thames, as well as necessary railways and other works. The cost would have been £1,469,000.

Among the powers sought was one enabling the Wharf Company to erect gas-works and manufacture gas for the purposes of their undertaking, and to this the Grays and Tilbury Gas Company, in whose area the proposed wharf was to be constructed, objected. They were represented, when the Bill came before a Committee of the House of Lords (under the Chairmanship of Lord Muir Mackenzie), by Mr. W. J. Jeeves, K.C., and Mr. F. N. Keen, but were unable to fight the matter because, as the result of opposition by the Port of London Authority, the Committee decided that the Bill should not be allowed to proceed. Thus, after the Gas Company had gone to the expense of opposing the Bill, they had not an opportunity of getting a decision on the principle involved.

An Outing.—The staff and employees of Messrs. A. G. Sutherland, Ltd., Birmingham, held their annual picnic on Saturday, July 5, when a large party travelled to Upton-on-Severn, where lunch was provided. The afternoon was occupied by an excellent programme of athletic sports, every event being well contested, and a very enjoyable day was spent.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for July 2.]

Nos. 15,046 to 15,601.

ACKROYD, J. H.—"Devices for regulating supply of fuel for gas-burners." No. 15,179.

BRADFORD, W. B.—"Gas-cock." No. 15,052.

CALDER, W. A. S.—"Scrubbers for scrubbing gases, &c." No. 15,261.

CARPMAEL, W.—"Process for obtaining gases rich in ethylene." No. 15,436.

CHEMISCHE FABRIKEN VORM. WEILER-TER-MEER.—See Carpmael, W. No. 15,436.

CUMMINGS, E.—"Geyser." No. 15,300.

DOCKING, A.—"Machines for mixing gas and air." No. 15,068.

HAGGIE, R. H.—"Manufacture of gas-mantles." No. 15,596.

MAIDSTONE GAS COMPANY.—See Bradford, W. B. No. 15,052.

PALMER, W. H.—See Calder, W. A. S. No. 15,261.

POOLE, D. C. E.—"Prepayment gas-meters, &c." No. 15,054.

RITCHIE, HART, & Co., LTD.—See Docking, A. No. 15,068.

RUDE, J.—"Gasification of fuel and production of gas." No. 15,497.

SMITH, D. J.—"Gas-producers." No. 15,299.

TWEEDIE, J.—"Joint for pipe junctions." No. 15,400.

WILSON GAS-METERS, LTD., G., and WILSON, J. H.—See Poole, D. C. E. No. 15,054.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following further notices regarding applications to the Board of Trade under the Gas Regulation Act.

SPECIAL ORDERS.

Brierley Hill District Gas Light Company.

The maximum price now authorized in respect of the supply of gas is 5s. 6d. per 1000 c.ft.; and the price which the undertakers have asked the Board of Trade to substitute for this is 16·6d. per therm. The undertakers are authorized to charge an additional 6d. per 1000 c.ft., or 1·2d. per therm, in the parish of Kinver.

Helston Corporation.

The Corporation have applied for an Order under section 10 to empower them to acquire the undertaking of the Helston Gas Light Company, to continue the business, and to borrow money for the purposes named.

Liverpool Gas Company.

The Liverpool Gas Company and the Hightown Gas and Electricity Company are jointly applying to the Board of Trade for a Special Order to extend the limits of supply of the former Company so as to include the urban district of Little Crosby; to authorize them to charge within the new limits differential prices which shall not be taken into account in determining the dividends payable by the Company; to transfer to the Liverpool Company the mains and pipes laid down by the Hightown Company within the new limits; and to change the name of the Hightown Company.

DECLARATION OF CALORIFIC VALUE.

City of Manchester Corporation.—450 B.Th.U. (Aug. 1.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration a copy of the following further Order made by the Board of Trade under section 1 of the Gas Regulation Act.

AMENDING ORDER.

Commercial Gas Company.

Application has been made to the Board of Trade under section 1 of the Gas Regulation Act, 1920, by the London County Council for an Amending Order revising the powers of charging for gas supplied by the Commercial Gas Company as authorized by their Order of 1921. The Board of Trade have, in accordance with the provisions of the Act, given notice that as from June 30, 1924, section 3 (standard price) of the Commercial Gas Company (Charges) Order, 1921, shall be read and have effect as if the words "eleven and two-fifths" were substituted for the words "fifteen and two-fifths."

Helston Gas-Works Transfer.—The Helston Town Council have affixed their seal to the contract for the purchase of the Helston Gas Company's undertaking. The Town Clerk stated that the Order would come into force at the end of August or the beginning of September, and 28 days later the Council would come into possession of the undertaking. The Gas and Lighting Committee were instructed to confer with the Gas Company's representatives and the Council's adviser as to the work absolutely necessary to be done for the town to be adequately supplied with gas during the coming winter.

MANCHESTER GAS DEPARTMENT REPORT.

At a recent meeting, the Gas Committee of the Manchester Corporation—the Chairman (Sir William Kay) presiding—adopted the report for the year ended March 31, for presentation to the City Council.

The following is a summary of the items of income and expenditure; the figures for the previous year being also given for the purpose of comparison.

1923.			1924.	
£	£	INCOME.	£	£
	1,172,215	Gas, &c.		1,093,161
		Residuals, &c.—		
257,789		Coke	292,547	
102,437		Tar	123,262	
19,210		Sulphate of Ammonia	27,417	
	379,436			443,226
	3,101	Sundry receipts		1,305
	1,554,752			1,537,692
		EXPENDITURE.		
		Manufacture—		
621,522		Coal and oil	577,290	
		Carbonizing wages, maintenance of plant, &c.		
234,061			197,771	
33,045		Renewals	40,408	
	888,628			815,469
		Distribution—		
		Maintenance of plant, salaries and wages, &c.		
158,522			155,047	
62,959		Renewals	67,136	
	221,481			222,183
	82,216	Rents, rates, &c.		80,411
		Management, collection, &c.—		
35,833		Salaries and wages	35,254	
		Less—Receivable from Electricity Committee for collection of accounts		
5,687			5,780	
30,146			29,474	
41,132		Other charges	42,954	
	71,278			72,428
	1,263,603			1,190,491
	291,149	Gross profit for the year		347,201
95,295		*Less*—Interest on loans, &c.	92,683	
11,229		Income-tax	39,800	
	106,524			132,483
	184,625	Net profit		214,718

The quantity of gas sold was 6,638,600,000 c.ft., an increase of 7·60 p.ct. on the corresponding figures for the previous year, and the average price realized was 3s. 2·63d. per 1000 c.ft., as against 3s. 8·76d. The Committee attribute this satisfactory increase to the more general adoption of the gas cooker and fire, the advantages of which are fully recognized.

The cost of coal and oil carbonized was as follows:

—	Gross Cost.	Less Income from Residuals.	Net Cost.
	s. d.	s. d.	d.
Last year, per 1000 c.ft. sold	1 8·87	1 4·02	4·85
Previous year ,, ,,	2 0·18	1 2·76	9·42

The reduction in the net cost represents a saving to the Committee of £126,410. The average gross cost of coal only, inclusive of cost of handling, was 24s. 0·56d. per ton, as compared with 29s. 3·52d. for the previous year.

The amount transferred from revenue to the credit of renewals account was £108,867, which, together with the interest on the fund, made a total credit for the year of £113,335; the sum of £94,812 was expended during the year. The balance to the credit of the account is now £167,465.

Additional loan capital has been raised to the extent of £165,000 during the year, for the extensions at the Bradford Road Works and for distribution purposes. The expenditure for the year amounts to £214,423 6s. 9d., of which sum £25,325 1s. 8d. was provided out of profits, and the balance out of loans. The total capital outlay at March 31 was £4,657,365, the loan debt in respect of which was £1,784,274.

As regards the proposed works at Partington, satisfactory progress has been made in the acquisition of land and easements and in the laying of the main pipe line, but no commitments have yet been entered into in respect of manufacturing plant.

The balance of the sinking fund unapplied at the commencement of the year was £70,080, and the amount provided out of revenue for the year was £112,714. Loan debt to the extent of £98,444 has been redeemed, leaving a balance of £84,350 not actually applied to the redemption of debt. Of this balance, £66,500 is invested in 5 p.ct. War Loan 1920-47, and the balance of £17,850 is in the bank. The total borrowing powers of the Department amount to £6,150,848, and loan capital has been raised to the extent of £4,379,937.

The Council, by resolution dated March 5, approved a further reduction in the price of gas, which took effect as from the reading of the meters for the quarter ended March 25 last. The amount of the reduction was 3d. per 1000 c.ft. to all consumers, and 6d. per 1000 c.ft. in the case of gas used for street lighting. Further, with a view to securing the more general use of the gas-fire in the average household, prices have been re-graded, in order that the ordinary domestic consumer may get the benefit of a lower price for a larger consumption.

NORTHAMPTON GAS COMPANY'S CENTENARY.

The Northampton Gas Company have now been in existence for a hundred years, and occasion has been taken of the event, by Sir Ryland Adkins, to write an interesting review of the activities of the undertaking, which has been published in the local "Daily Echo." From this we extract the following:

What are now called statutory companies—that is, commercial companies regulated by special Acts of Parliament—have long been a feature of our national life, and the Northampton Gas Company is one of the oldest. The undertaking was what is called a 5 p.ct. company—that is, the dividend to which the shareholders are limited; and as most people, alike those who succeed and those who fail in their investments, always want more than 5 p.ct., the Gas Company have relied on their security and unaffected stability to procure the financial support that they required. In this they have been remarkably successful. There are people in Northampton who will buy gas shares to-day at a price which cynical critics would say was only justifiable for Government securities before the war. But these local investors are no fools, and they know how solid and safe a business has been built up by the combined action of engineers, directors, and those who are responsible for the public policy of the town. Indeed, the Northampton Gas Company is as good an example as could easily be found of how an enterprise, privately managed, but publicly controlled, can, if continued with tact and judgment, obtain a position at least as good as that possible for national or municipal enterprises.

But this has been done, like all instructive successes, by the careful and considered action of a large number of individuals. Gradual change in the perspective of the gas industry, which now has more to do with heat even than with light, has been conducted in Northampton with quiet skill. The Directors, taking them over a long series of years, have apparently recognized that in one sense they are less powerful than the community whose reasonable needs they must satisfy or than their own engineers, whose special knowledge is required daily to maintain the undertaking in efficiency and peace, and the Company have been unusually successful in the sequence of their Managers. For much the greater part of the century the undertaking has been managed by three Mr. Eunsons—grandfather, father, and son. Hereditary talent is extremely rare, though everybody is inclined to think that he or she possesses it. The first Mr. Eunson was a man of much chemical knowledge, with a real turn for original invention. Some of his devices are still alive and in use in certain departments of engineering to-day. Where there is success in several generations, the spark of originality is generally recognized at the beginning of the sequence.

But it has been the late Mr. Eunson who has been, more than any one man, the Northampton Gas Company. He was a sound and thoughtful engineer. The whole sap of a powerful mind and a resolute will were devoted first to the professional and technical side of this undertaking, and secondly to that study of human nature which is ever required by an expert manager if those who employ him are to be kept pleasantly purring and if those who are entitled to watch and regulate are to be kept justifiably contented. Very few shrewd men or men more honestly devoted to their regular work have moved about in the life of Northampton than Mr. John Eunson; and it is due to him, with the support of successive Chairmen and the cool-headed legal caution of the late Dr. Faulkner, that the Company have become so widely accepted as a permanent and beneficial element in the life of Northampton.

As compared with other companies, in its legal rights, and in its conditions, it is not easy to describe it in a short article intended for the general reader. As far as one phrase can express it, it may perhaps be said that it has greater freedom and scope of management than most statutory companies, while on the other hand its profits are more rigorously and uniformly limited. The sliding-scale system, widely prevalent now, has not been asked for by the Gas Company, nor the public, and as long as things are managed as they are, it probably will not be.

Of the present Engineer, Mr. George Eunson, whom Northampton knows so well, the double object of preserving his modesty and of telling the truth can perhaps best be served by saying that he is worthy of his father and his father's training, and that his incurable youthfulness is a sign of vitality and not of want of knowledge and judgment.

So that the continued and vigorous life of a company 100 years old is of consequence outside the supply of gas or the payment of employees or the receipt of limited dividends. Between unrestrained individual enterprise and complete State management of any industry there is an infinity of degrees and of types. Only politicians in moments of paroxysm venture to condemn all these types for the sake of praising one. People who are concerned to observe the life of the community apart from their own pre-dispositions and without excluding any facts, will probably agree that the story of a Statutory Company in a vigorous borough like Northampton, led all through by citizens of repute, and maintaining its position at once controlled and independent, is worth recording in the modern history of Northampton, and makes a story which throws credit primarily on those who have guided it, but also upon the authorities and the inhabitants of the town.

The Belfast Corporation Gas Department are asking the Electricity Department to pay £1500 annually to defray the cost of collecting the accounts of electricity consumers—work which the former department have looked after for many years. The Electricity Committee are now considering doing their own collecting.

BRADFORD CORPORATION GAS REPORT.

In his report to the Gas Committee of the Bradford Corporation on the working of the department for the year ended March 31, Mr. Charles Wood (Engineer and Manager) said the accounts prepared by the City Treasurer show that the gross income for the year amounted to £569,102, and the expenditure to £457,535—leaving a gross profit of £111,567. The following charges had also to be met: Interest on loans £40,175, contribution to sinking fund £18,266, and income-tax £14,699; so that the net profit is £38,427, as against £25,301 last year. By the transfer of the net profit, and after providing for an appropriation of £13,000 for the relief of the city rate, the net revenue appropriation account now has a credit balance of £42,671. During the year, £13,306 has been spent on capital account; £11,780 being for new mains, £150 for the cottage and governor house at Union Road, and £1376 for plant at the chemical works. The total expenditure on this account has been increased to £1,310,127, and of this amount £591,217 remains outstanding, £718,710 having been provided for redemption of loans.

The amount received for gas was £362,207, or £3381 more than in the previous year. The revenue per 1000 c.ft. sold shows a decline from 3s. 9·776d. to 3s. 7·758d.; this being attributable to the operation of the July, 1922, reduction during the full year. The sales of gas for the year show an increase of 105,315,000 c.ft., or 5·99 p.ct. more than last year; the yearly total being 1,986,604,000 c.ft., as compared with 1,881,289,000 c.ft. in 1923. The increase in sales is a very gratifying feature of the year's working, and though a large part of the increase has been taken by the street lighting, other classes of consumer have required larger supplies during the winter months. The quantity of gas made was 2,149,340,000 c.ft., as compared with 2,047,460,000 c.ft. during the preceding year; being an increase of 101,880,000 c.ft., or 4·97 p.ct. The make per ton of coal carbonized shows a slight reduction on last year's figure, being 13,299 c.ft.; but the standard of quality has been further improved.

The markets for residuals have again been unsteady throughout the year, and except for coke, have not been favourable, but the total receipts under this head were £139,279, or £14,255 (equal to 0·876d. per 1000 c.ft. sold) more than last year. The receipts for coke (including breeze), after deducting handling and carting costs, were £85,386, or £15,224 more; the average price realized per ton being 21s. 5·84d., as against 19s. 4·64d. last year. During the year the demand for coke has been exceptionally good, and it was possible to dispose of all the make. The selling price was increased during the latter part of the year from 22s. 6d. to 30s. per ton. The quantity produced for sale was 79,478 tons, the yield per ton of coal carbonized (9·83 cwt.) being slightly better than in the previous year. The local requirements have been given prior consideration, and an analysis of the sales shows that 11 p.ct. of the total was supplied to private houses, 34 p.ct. to Corporation departments, schools, churches, &c., and 55 p.ct. for trade purposes; a small quantity sold for export being included under the latter heading. The receipts for tar show only a slight increase on the previous year, being £57,036, compared with £37,002. The production has been 9685 tons, or 11·69 gallons per ton of coal, against 8117 tons in 1923; but the average price realized per ton has fallen from 91s. 2·04d. to 76s. 5·77d. The markets for pitch and other products abstracted from tar have been unfavourable, and whereas during the the preceding year a constantly increasing price for tar was obtained, this year it has been exactly the reverse, and values have fallen approximately 50 p.ct.

The revenue from ammoniacal liquor, which, except for a small quantity from Low Moor Works, goes to the chemical works, amounts to £9740, or £746 more than last year. The production was 22,961 tons, or 31·04 gallons per ton of coal, the average price realized per ton being 8s. 5·80d., against 8s. 3·60d. in 1923. Receipts for spent oxide show a decrease of £91; and the gross profit on the chemical works is £7117, compared with £8866 in 1923. The markets for the products of the chemical works have on the whole been worse than last year. Lower prices have had to be taken, particularly for export, while nitrogen compounds prepared from the atmosphere are coming forward in increasing quantities and making the markets more difficult.

This year it has been necessary to carbonize a larger quantity of coal; and though the cost per ton has been reduced, the expenditure for coal has increased by £4886, the total cost of the quantity carbonized (including carriage and handling charges) being £191,965, or an average of 23s. 9·07d. per ton, against £187,079, or an average of 24s. 10·28d. per ton last year. The quantity carbonized was 167,613 tons, or 11,087 tons more than during 1923. The cost of coal, after deducting receipts from residuals, is this year £52,687, or £9368 less than the previous year; the receipts from coke giving 44 p.ct., and liquid products 28 p.ct. of the cost of coal.

Repairs and maintenance of works and plant required £69,264, or £4201 less than last year. New mains and services and repairs and maintenance of mains and services have entailed the expenditure of £27,380 on revenue account and £11,782 against capital account. The prices of materials used under this head, especially cast-iron pipes, have shown considerable advances. During the year, 19,500 yards of mains varying in size from 3 to 14 in. have been laid, and further works have been necessitated by street improvements executed in the City. Carbonizing wages, owing to the increased tonnage of coal used this year, have taken £2509 more. Repairs and maintenance of meters have cost £1164 less. The cost of meter inspection shows a decrease of £1035; bad debts are £831 less; salaries £360 less, and miscellaneous expenses £625 less.

Following the decline in the cost-of-living figures, and in accordance with the terms of the Sliding-Scale Agreement which the Joint Industrial Council set up during 1921, the rates of pay of gas-workers were reduced from April 9 and Sept. 1, each reduction being at the rate of ½d. per hour, or 4d. per shift, *plus* 12½ p.ct. During the year consideration has been given to the Sliding-Scale Agreement, and amendments have been ratified which will ensure the regulation of wages on this basis for a further period. Under the amended agreement, and by reason of the rise in the cost of living, wages were advanced from Jan. 1 by ½d. per hour, or 4d. per shift, *plus* 12½ p.ct.

The total expenditure on street lighting was £74,494, or £15,564 more than in 1923. Following the decision of the City Council in September, the pre-war lighting was restored, the whole of the lamps being left lighted all night. Consequently the quantity of gas used, 216,046,000 c.ft., shows an increase of 86 millions on the previous year, and this accounts for the whole of the increased costs.

The sales of appliances through the Darley Street showrooms are again satisfactory; and consumers are availing themselves more fully of the facilities provided for them to become acquainted with the appliances best adapted to their particular requirements.

HASTINGS AND ST. LEONARDS GAS ORDER.

An inquiry was held by Mr. H. C. Honey (Director of Gas Administration at the Board of Trade) at the offices of the Board on Monday, June 23, into an application by the Hastings and St. Leonards Gas Company, for a Special Order under section 10 of the Gas Regulation Act. The main purpose of the Order is to extend the area of supply and to charge a differential price in the added area.

There was opposition by the Hastings Corporation, for the purpose of safeguarding the interests of consumers in the borough; by the Battle Gas Company, which is a non-statutory undertaking, in whose area the Hastings and St. Leonards Company sought powers to supply; by the Southern Railway Company, with regard to supply for other than lighting and domestic purposes from mains of insufficient capacity, the provision of stopcocks on mains, &c.; and by the East Sussex County Council, who asked that, if the position of the Company's mains had to be altered when roads were being reconstructed, they should be altered at the expense of the Company.

The Hastings and St. Leonards Gas Company were represented by Mr. E. C. Cooper (Messrs. R. W. Cooper & Sons, Parliamentary Agents); the Hastings Corporation by Colonel Cox (of Messrs. Dyson, Bell, & Co., Parliamentary Agents); the Battle Gas Company by Mr. A. J. Lees (Messrs. Lees & Co., Parliamentary Agents); the Southern Railway Company by Mr. A. B. Marsh; and the East Sussex County Council by Mr. M'Ilween (Clerk to the Council).

Mr. E. C. Cooper, opening the case for the promoters, said that the Hastings and St. Leonards Company was established in 1854, and had obtained various Acts, the last one being passed in 1899. They were a sliding-scale company, and had also obtained an Order under section 1 of the Gas Regulation Act, which fixed the standard price of gas at 15·6d. per therm. The present price was 11·5d. Under the powers of the Act of 1899, the Company had constructed extensive gas-works at Bexhill. They had then been negotiating with a view to supplying Bexhill, but the negotiations had broken down on the question of price. The Hastings Company, however, had been manufacturing gas at Bexhill since 1904 or 1905, and on the Bexhill site there is now a considerable surplus area.

Dealing with the clauses of the Order, Mr. Cooper said it was proposed to extend the limits of supply to include, in addition to the existing limits, the urban district of Battle, and the parishes of Guestling, Pett, Westfield, Sedlescombe, Brede, Mountfield, and Whatlington. The scheme for the supply of the added area ultimately would be to supply through a high-pressure steel main. Power is taken for the Company to charge a differential of 4d. per therm in the added area, and to issue the unissued preference and debenture stock as redeemable stock. There were also provisions for co-partnership, and various other miscellaneous powers.

As to the objections, the East Sussex County Council had submitted a clause for insertion in the Order, but the promoters were unable to accept it in that form. The Battle Gas Company were a non-statutory concern, with capital powers, up to a few years ago, of £2400. Negotiations had been entered into by the Hastings Gas Company and the Battle Gas Company, and a figure was arrived at which Mr. C. F. Botley (Engineer and Manager of the Hastings Company) had agreed to submit to his Directors as the purchase price for the Battle undertaking. They were unable to accept the figure, and the door had been closed to further negotiations. The Hastings Company had no desire to treat the Battle Company unreasonably or harshly, but felt that the Battle area ought to be in their district. It was not a big matter for the Hastings Company, and they were not prepared to pay more than what they considered was a reasonable price for the undertaking. The demand in Battle was not large, but the Hastings Company were proposing to lay a main through that area to supply beyond it.

In regard to the Hastings Corporation, there was some misunderstanding, owing to the unfortunate illness of the Town Clerk, who had interviewed Mr. Botley and the Solicitor to the Company. It was claimed on behalf of the Company that agreement had been reached on some points, but Col. Cox said he had instructions to oppose and they had not been cancelled. With regard to the differential price of 4d. per therm in the new area (which was one of the points of objection), Mr. Cooper said the Corporation appeared to be apprehensive that this was not sufficiently high to ensure that consumers in Hastings would not be prejudiced through the extension of the Company's limits. He understood, however, since he had been in the room that morning, that the point of difference was not as to what should be the maximum differential, but that there should be an obligation to charge a higher price in the new area than in the existing area.

Objection was next raised to a clause giving power to issue preference stock after the date of the Order at a rate not exceeding 7 p.ct. per annum, or such higher rate as the Board of Trade might approve. It was held by Mr. Botley that the Town Clerk had waived his objection to this, on the ground that the Company were capable of looking after their own interests, and would not issue capital at a higher rate than necessary, and that he had pledged himself to state the Town Clerk's views. Col. Cox, however, said he was instructed that the objection had not been waived. He himself had drawn the attention

of the Town Clerk to the matter, because 7 p.ct. was a high rate for preference capital, and in many cases it had been knocked down.

Mr. HONEY said the Board of Trade would not agree to the words "or such higher rate as the Board of Trade may from time to time approve." He agreed that the words had been included in a certain number of Orders made in the early days.

Mr. COOPER urged that there was no objection to their inclusion, and pointed to the difficulties which had faced gas companies in recent years through the condition of the money market.

The next objection was to a clause providing for the formation of a renewal fund, and here again Mr. Botley said agreement had been reached.

Another clause to which objection was taken was one enabling the Hastings Company to enter into agreement with gas companies whose limits adjoined or were near their own limits for the supply of gas by either within the limits of the other, for the supply in bulk by either Company to the other, and for the working of any part of the undertaking of one Company by, and the execution of any works for and on behalf of, the other. The object of the clause, said Mr. Cooper, was to give greater elasticity to statutory companies to enter into working arrangements with smaller neighbouring companies. Frequently a small neighbouring company had a detached portion of their area which was costly to supply, and it could be supplied more conveniently by their larger neighbour. He understood that the Corporation were apprehensive that the Hastings Company might, under the clause as framed, be absorbed by the Battle Company, but, of course, there was no intention of that. He could not see how this could be the effect of the clause, but if an amendment were suggested which would do away with the possibility of such a result he would accept it.

Col. COX said his objection went beyond that. There was very little that the Company could not do under the clause. He wanted the powers restricted to making agreements with statutory companies only, as had been done in a recent case by Parliament. The power to enter into agreements with companies whose limits were "near to" the limits of the Hastings Company, and the power to enter into agreements for "the working of any part of the undertaking of one Company by and the execution of any works for and on behalf of the other" were very broad. However, he reserved his right to object until he saw the amendment which the promoters would agree to make.

Objection was also taken to a clause repealing a provision in the Company's Act of 1899 which limited the amount of undivided profit to £55,000. Mr. Cooper said the Company wished to get away from that, because it was inconsistent with the principle upon which the sliding-scale was based. There should be no retention of undivided profits under the sliding-scale. How the clause got into the 1899 Act he could not say, but the principle of the sliding-scale must have been lost sight of. It had been arranged between the Company and the Town Clerk, however, that if the Board of Trade did not see their way to repeal the provision, they should be asked to raise the amount to £75,000 or £80,000, inasmuch as the Town Clerk had agreed that £55,000 was unreasonable under existing conditions, having regard to the present value of money, the increased capital expenditure on the works, and so on.

Col. COX said he was instructed that the Corporation considered there should be a limitation, to prevent the Company doing as they liked.

The objection of the East Sussex County Council was then dealt with.

Mr. M'ILWEEN (Clerk to the Council), who admitted that he regarded his application as a forlorn hope, said he had submitted a clause to the Company dealing with the question of altering the position of mains when roads were reconstructed, but they had altered the clause so much that it appeared to be a clause for the protection of the Company rather than of the Council. After pointing to the vast sums which had to be spent in order to maintain roads in such a condition as to meet modern requirements, he said the County Council asked that, when it was necessary to reconstruct roads, if the position of gas-pipes had to be altered it should be paid for by the Company. The County Council did not reconstruct roads for profit, but as a public duty. The Gas Company, however, were a profit-making concern, and to suggest that when the Council found it necessary to interfere with mains, the cost of moving these mains should be borne by them and not by the Company, was unjust and wrong. As to the position at law, the Council were governed by the Highways Act of 1864, in which there was no compensation clause, and, if they rested upon that general law, they could bury the mains 10 or 20 ft. when raising the level of the road, or, alternatively, when lowering the level, they could leave the mains nearer the surface than they should be without being liable for compensation. Why should they? They were there first, and that was the opinion given recently by a very learned Counsel. He pressed for the insertion of the clause, though he regarded it as a forlorn hope. He would like Mr. Honey to report the matter to the Board of Trade, however, because he did not think that the present stereotyped practice should go on, in view of modern conditions.

Mr. COOPER said that originally the clause was to apply to the whole of the Company's area of supply, but they had limited its application to main roads in the added area, as they objected to being placed under a new set of restrictions regarding their existing area.

After further discussion of the principle involved, the matter was left for the Board to deal with.

Mr. *C. F. Botley* (Engineer and General Manager of the Hastings and St. Leonard's Gas Company) then gave evidence. He said that the sales of gas per annum approached 500 million c.ft. The declared calorific value was 460 B.Th.U., but they actually supplied an average of 470 B.Th.U. The works had been removed to Bexhill because the Hastings Corporation were desirous of having them removed from the town. As to the differential price of 4d. per therm in the added area, and the suggestion that the Company should be compelled to charge that amount, witness pointed out that the Corporation were supplying electricity in the borough. If they obtained an Order from the Electricity Commissioners enabling them to supply electricity in the outlying districts which the Gas Company were seeking to supply under this Order, it would mean that they would find themselves tied to a certain price for gas, and the Corporation would be able to charge what they thought fit for electricity.

With regard to the Battle Company's works, Mr. Botley said he had had charge of those works from 1897 to 1918. Their present sale approached 5 million c.ft. per annum. In 1921 the position of the undertaking was such that the Directors could not carry on, and had decided to close-down or sell the undertaking. They had found a Syndicate to purchase the works, however. The nominal capital at that time was £2400, and the Syndicate had acquired the shares, of £10 each, at £2 10s. per share; in other words, at a discount of 75 p.ct. They did not wish to be overbearing or unreasonable towards the Battle Company. He had suggested in 1923 that they should supply the Battle Company with gas in bulk, or that the Hastings Company should buy the Battle undertaking at an agreed figure. He believed the latter was the course which had commended itself to the present owners of the Battle Company, but they had not been able to agree a figure. The Company were in a bad condition, and he had offered £1500, *plus* any capital which the present owners had spent since taking over the undertaking, but this had been refused; the price asked by the owners being £4500. However, they did not see their way to pay this amount for it.

If the Hastings Company did not acquire the Battle undertaking, said witness, he would ask the Director to give them power to lay their mains through Battle for supplying the new area beyond that. If the Battle Company were given the £4500 they asked for their undertaking, and the cost of reaching the Battle consumers was added, he estimated that the expenditure would be £8000. Also, he was apprehensive that there might be a little leakage, and he would have to adjust the appliances of consumers in Battle, and so on, so that the cost would be more than £8000. They could manufacture gas more cheaply than the Battle Company, but whether they could distribute more cheaply in Battle was another matter.

Dealing with the question raised by the Corporation as to the adequacy or otherwise of the differential to be charged in the added area, witness said he had pointed out to the Town Clerk of Hastings that, taking Battle as an instance, the differential would represent 18·4d. per 1000 c.ft. On to-day's basis the price in Battle would be 5s. 11·3d. per 1000 c.ft., as against 4s. 4·9d. in Hastings, and he thought that this was enough to ask the Board of Trade to grant. If, however, the Board thought fit to alter the figure to a higher maximum, the Company would have no possible objection.

As to the maximum dividend of 7 p.ct. which the Company asked in respect of preference capital issued after the passing of the Order, witness said the Company already had power to pay 6 p.ct. on preference stock. It was thought wise to take power to pay 7 p.ct., and that figure was not too high, having regard to the possible future condition of the money market. However, he would leave that to the discretion of the Board of Trade. Power to create a renewal fund, such as was asked for in this case, had been granted in a number of Orders. It was an increasingly useful power to have, and was decidedly in the interests of all concerned.

With regard to the repeal of section 40 of the Act of 1899, which limited the amount of undivided profits of the Company to £55,000, witness said that the Town Clerk had been very fair about this, and had realized that if the Company were before Parliament the sum of £55,000 would, in any circumstances, be considered inadequate. Therefore, he had agreed that the Board should be asked to repeal the provision, or, failing repeal, to increase the figure to £75,000 or £80,000.

Dealing with the clause relieving the Company from any obligation to supply gas for other than lighting or domestic purposes from mains the capacity of which was insufficient for the purpose, witness said this was not a matter of very great importance to the Railway Company in the district, though it was important to the Company. However, they were content to withdraw the clause pending agreement between the railway companies and the gas industry as to the form which the clause should take for general application.

Mr. HONEY pointed out that the matter was to be dealt with in connection with the Pinner Gas Company's Order, and he took it that whatever decision was arrived at would apply automatically to any other Orders outstanding at that time. Therefore, the clause would be withdrawn from the present Order, on the understanding that, if the promoters desired, the Pinner clause would be inserted later.

This was agreed to.

Mr. *Botley*, dealing with the application of the Railway Company for the insertion of a clause imposing an obligation upon the Gas Company to provide a stopcock on mains where the Railway Company's engineer required it, said that he was in a better position to know whether a stopcock was necessary than the Railway Company's engineer, and, of course, one would be provided where requisite. They objected to being placed under such an obligation as was suggested; but if such a provision were inserted, it should be provided that the Gas Company should have some say as to the position of the stopcock, and have access to it at all times.

Mr. *A. Cunnington* (Lighting Engineer, Southern Railway Company) said it was important that they should be able to turn off the gas, especially from a damaged high-pressure main, in cases of emergency. For instance, in the case of a railway accident, or a derailment, it was absolutely essential to be able to cut off the gas close to the scene of the accident. The Railway Company would agree to a reasonable amendment of his suggested clause, which would give the Gas Company access. There had been cases in which serious results had followed leakage from a gas-main that had been started by an accident, and where there had been no means of cutting off the gas until after a considerable lapse of time, because the stopcock was a considerable distance away. He referred to a case (during the war) in which a bomb had dropped on the Grosvenor Road Bridge, in London, and a main belonging to the Gas Light and Coke Company had been damaged.

Mr. COOPER said the Railway Company were asking the Board of Trade to legislate in normal times for something which might happen in abnormal times, and it would mean that gas companies would have to provide thousands of stopcocks.

Asked by Mr. Honey where the Railway Company would want

stopcocks, Mr. Cunnington said they would want them where there were mains on bridges over railways, and also at level crossings, &c.

Mr. Honey pointed out that the practice of the Board of Trade was to put in provisions differing from the general law only in cases where these provisions were agreed between the parties, or where there was a strong case for amending the general law. If the Railway Company had a strong case, it was a matter for consideration by the Board of Trade, notwithstanding that the Gas Company did not agree with the suggested provision. But he did not gather that they had a strong case, or that it was a matter of much practical importance.

After the luncheon interval, Mr. Botley was cross-examined at some length by Col. Cox (for the Hastings Corporation), who quoted from the last census returns to show that the population in the area which it was proposed to add to the Hastings Gas Company's limits of supply had decreased between 1911 to 1921, and suggested that it would not be an economical proposition to supply those areas. Therefore, a burden would be imposed upon consumers in Hastings.

Mr. *Botley* said that the population in the areas concerned was increasing at present, and that there was considerable development.

Col. Cox also pointed out that if the Gas Company were not given powers to supply in the area of the Battle Gas Company, the population of the added area would be still further reduced.

In reply to questions as to the estimated cost of the whole of the scheme for supplying the added area, Mr. Botley said he had no detailed estimates of the whole scheme, because it was problematical. Col. Cox expressed surprise at this, and Mr. Botley said it was not the intention to supply the whole of the added area immediately, but only those parts in which a demand had arisen. He had prepared estimates of the cost of supplying those areas in which there was a demand, and, obviously, the remainder of the area would not be supplied until it was an economical proposition to do so. The supply would be at low pressure at first, but eventually the main would be extended to complete the circuit round the new area, and the pressure would be increased as the demand grew. He had canvassed the part of the area which it was proposed to supply immediately, and knew what demand he would have to meet.

Pressed further by Col. Cox in regard to the cost of supplying the new area, the demand in those portions of the area which it was not proposed to supply immediately, and so on, Mr. Botley pointed out that the question of the differential price was one which had been discussed with the Town Clerk, and agreed upon. Therefore, Col. Cox was cross-examining on a matter on which he would have been able to give chapter and verse, but he had not brought the details with him, in view of the result of his interview with the Town Clerk.

In the course of further discussion, Mr. Botley said he would undertake not to supply gas within the added area at a price which would impose a burden on consumers in the existing area of the Company, which they would not otherwise have to bear.

Mr. Cooper interposed to point out that the Company's existing area of supply was larger than the area of the borough, and that Col. Cox had no right to ask for an undertaking in respect of that part of the area of supply which was beyond the borough area, although Mr. Botley had said (rather hastily, perhaps) he would be willing to give an undertaking.

In the course of argument on this point, Mr. Botley said there was a portion of the existing area, beyond the borough, in which there is at present no supply, and it would be unfair to ask for an undertaking in respect of that portion. Finally, Mr. Botley gave an undertaking that the Company would not supply the added area to the prejudice of consumers within the borough, and the matter was left there, the form of the undertaking to be agreed between the Corporation and the Company.

As to the suggested maximum dividend of 7 p.ct. on new preference capital, witness said the Town Clerk was willing to leave that, because he could trust the Company in their own interests not to raise money at ridiculous rates. Col. Cox thereupon put forward the view that this safeguard should be sufficient to preclude the necessity for any limitation at all, but witness would not agree to that, being of the opinion that a reasonable limitation was justifiable.

With regard to the clause providing for a renewal fund, Col. Cox said that renewals had been met in former years by carrying the amounts to a suspense account and writing them off over a number of years, and therefore the suggested clause was unnecessary. Witness held, however, that renewals and maintenance should be dealt with in the statutory manner authorized by the Board of Trade, rather than be left to the discretion of the administrators of the Company. Col. Cox replied that the insertion of this clause had not been fought out before the Board of Trade, and in cases where it had been inserted previously it had been by agreement. In these circumstances there was a possibility of clauses being adopted for general application without adequate consideration. He suggested that the wording of the clause did not ensure that the fund would be applied only for the purpose for which it was established, and he was concerned to make sure of that. He would ask for the clause to be deleted, because the Company would have a reserve fund, special purposes fund, and so on, and could build up a considerable reserve in one way or another. Another suggestion made by Col. Cox was that the amount to be allocated to that fund per annum should not exceed 0·5 p.ct. of the aggregate capital expended on the undertaking, but Mr. Botley did not indicate whether or not he would agree to that.

As to the clause giving power to enter into agreement with other companies for the supply of gas in bulk or otherwise, Col. Cox asked for an amendment to provide that such agreements should be entered into only with other gas companies "working under statutory authority," and also that such agreements should be subject to the approval of the Board of Trade. Otherwise, he would ask for the clause to be deleted.

With regard to the clause in the 1899 Act limiting the carry-forward to £55,000, Col. Cox pointed out that under the sliding-scale the Company could increase or reduce dividends according to the increase or decrease in the price of gas, and therefore if they accumulated a large carry-forward, although the shareholders were denying themselves a dividend, they were at the same time denying the consumer a reduction in the price of gas.

Mr. *Botley* said this was not the intention.

Col. Cox said that might be so, but he was concerned with the principle. He quoted figures from the 1923 accounts to show that the amount carried forward, in respect of accumulated profits, reserve, insurance, &c., totalled over £57,000. He agreed that more than £10,000 of that sum was distributed in dividends, but during the two months which elapsed between the end of the financial year and the time the dividends were paid, the total amount was in excess of the £55,000 allowed.

Mr. Lees, cross-examining on behalf of the Battle Gas Company, quoted from the reports made by Mr. Botley to the previous owners of the Battle Company in 1920 and 1921, advising them to sell, and sought to show that Mr. Botley's statement that he had severed his connection entirely with the Battle Company in 1918 was not true.

Mr. *Botley* replied that he had been asked by one or two of the then Directors (who were personal friends) to advise them, and had done so in a purely honorary capacity.

Mr. Lees then quoted from the correspondence between Mr. Botley and the present owners of the Battle undertaking at the end of last year with regard to the purchase of the Battle undertaking by the Hastings Company, and said it was clear that the price of £4500 was suggested by Mr. Botley himself.

Mr. *Botley* replied that the Battle Company had originally asked £6000, but after negotiations he had stated he would be willing to put a figure of £4500 before his Board, though he would take no responsibility. His Board, however, did not entertain this price.

Mr. Lees then dealt with the census returns in the added area, and said there was only one house in every 24 acres. He supposed Mr. Botley did not think much of that rural area for gas supply purposes without the urban district of Battle.

Mr. *Botley* agreed that it would be unfortunate if Battle were not included in the area. He was not prepared to strike the urban district of Battle out of the Order at present.

In the course of further argument, Mr. Lees pointed out that Mr. Botley had advised the Battle Company to sell in 1921, and yet he was asking for powers to compete with them. It was unfair to allow a statutory company to compete with a non-statutory one. If the Order were granted, it would allow the Hastings Company to compete with the Battle undertaking, and Mr. Lees asked that the Battle urban district should be struck out of the added area, or that the Hastings Company should agree not to supply there unless they bought the Battle undertaking. There was no objection to mains being laid in Battle for the purpose of supplying the area beyond.

This closed the promoters' case, and the inquiry was then adjourned.

Wednesday, July 2.

On the inquiry being continued to-day, there was a good deal of discussion, which centred round a statement by Col. Cox (for the Hastings Corporation) that the Hastings Gas Company were repudiating the undertaking given by Mr. Botley at the previous hearing.

Col. Cox said that on June 24, the day following the first sitting, the Town Clerk had written to Mr. A. E. Young (Secretary and Solicitor to the Company) submitting the following form of words, to carry into effect the undertaking: "The Gas Company undertake that, in the event of the area of supply of the Company being extended, they will not at any time supply gas to the added limits except on such terms and in such manner as will not prejudice the consumers of the existing area." Then Mr. Young had telephoned to the Assistant Town Clerk that the Company had refused to give any undertaking.

Mr. Cooper stated that this re-opened the whole question as to the arrangement between the representatives of the Company and the Town Clerk at the interview referred to at the last hearing. The interview was for the purpose of arriving at a settlement, and the Town Clerk had regarded it as so satisfactory that he had proposed not even to be represented at the inquiry.

Col. Cox remarked that what happened at the interview was beside the point, in view of the undertaking given by Mr. Botley.

Mr. Honey said it seemed to him that Col. Cox had taken a perfectly proper attitude at the first hearing. The agreement which the Company said was come to at the interview was never completed.

Mr. Cooper replied that it was completed in so far as arrangements were come to, and the Town Clerk had undertaken to write to Mr. Young confirming the terms. From that day to the present, however, the Company had never received that letter.

Mr. Honey said in these cases it was obvious that when negotiations took place between the parties before the inquiry, unless they were completed they were generally without prejudice.

Mr. Cooper then read a letter which had been written by Mr. Young to the Town Clerk on June 26, pointing out that at the previous hearing the Parliamentary Agents for the Corporation had said they were instructed to raise various points which it had been agreed at the interview should not be raised. It was remarked in the letter that it was unfortunate that the Town Clerk had been unable to write, as promised, the terms of the agreement, and that he had stated that he would discuss with the Company the points on which he wanted amendments, and that every other point was waived. With regard to the price in the added area, the letter stated that the Town Clerk had agreed to be bound by whatever the Board of Trade might consider was a fair price to be charged in the added area, if the Board thought that 4d. per therm in excess of the sum charged in the present area was insufficient. There was no mention by the Town Clerk that such a charge should be an obligatory charge in the added area, to continue for all time. The Corporation's Parliamentary Agents, however, had taken the attitude that the Corporation required the additional charge to be an obligation, and even went so far as to cross-examine with a view to saying that the extension of the area would be unremunerative to the Gas Company, in spite of the Corporation, in their objection, saying that they did not wish to object to the extension of the limits of supply. Other points raised in the letter were that the Town Clerk had expressed satisfaction that the Company would not issue preference stock at a higher rate than the market value of money at the time of issue, yet the Parliamentary Agents had wanted this clause amended. With regard to the clause giving power to enter into agreements with

other companies as to the supply of gas in bulk or otherwise, the Town Clerk had expressed a wish that this should be altered so that nothing should be done behind the back of the Board of Trade, and had stated that he would send a draft of the clause he desired inserted. This, however, had not been done. But the Parliamentary Agents had gone beyond this, and had asked that certain words should be struck out. The Company had no objection to the words suggested by the Town Clerk being inserted, but there was nothing mentioned at the interview about the other words being struck out. The repeal of the clause limiting the aggregate of the insurance fund, reserve fund, and accumulated undivided profits to £55,000 was also mentioned; it being pointed out that the Town Clerk had agreed that, if the Board of Trade objected to repeal, the amount should be increased to £75,000 or £80,000. Therefore, Mr. Young had pointed out that it was only fair he should have an answer from the Town Clerk; and if he were not correct in his understanding of the interview, then the Town Clerk should let him know the points of difference, and give the necessary instructions to his Parliamentary Agents on the terms actually agreed. On June 30 the Town Clerk had replied that he had no authority to waive any points. Also, he could not agree with Mr. Young's interpretation of the interview as to the differential price, as he was most emphatic that there should be a minimum charge in the added area which should be greater than the charge in the present area. He also emphasized the point that Col Cox did not in any way exceed his instructions in this matter.

Mr. HONEY said he could not sit in judgment on the proceedings at a private conference between the Company and the Town Clerk. He could only consider what took place at the inquiry. At that inquiry an undertaking was given to the Board of Trade, and he could not see any ground for going back on it. He also intimated that the Board would not agree to place an obligatory charge on the added area.

Mr. COOPER held that the undertaking was not given to the Board of Trade, but was a private arrangement between the parties, if it was any arrangement at all.

Col. COX said the Corporation were placed in an awkward position, and the only course open to him was to ask the Board of Trade to put a clause in the Order to embody the undertaking given by Mr. Botley. Obviously, an undertaking which the Company had repudiated was worthless.

It having been ascertained by Mr. Honey that the Hastings Company are now supplying outside the borough, Col. Cox said that it would be sufficient for the Corporation to protect their own constituents, but from the public point of view it was necessary that the undertaking should apply to the whole of the existing area.

Mr. HONEY said his difficulty was, from the public point of view, that if this matter had been argued on its merits, he was not sure that the Corporation would have had any case at all, in view of the provisions of the sliding-scale, which made it to the interest of the Company not to do anything that would tend to increase the price of gas.

Col. COX said he was content if the words "the consumers in the Borough of Hastings" were substituted for "the consumers in the existing area" in the form of undertaking suggested by the Town Clerk.

[The remainder of our report is held over till next week.]

STOURBRIDGE GAS DEPARTMENT.

Mr. C. H. Webb, M.Sc., A.M.Inst.C.E., in his nineteenth annual report, states that the sale of gas shows an increase of about 12 million c.ft., due to a slight improvement in the state of trade, and the severe weather in the winter. The gas unaccounted-for remains about the same as last year. Notwithstanding several decreases in the price of gas during the year, the Department are able to carry forward to profit and loss account £26,915—an increase of £3498. The efficient working obtained by the vertical retorts has contributed to this good result, which would have been better still had vertical retorts been used alone. The balance from revenue account is subject to income-tax, annual instalments (inclined vertical-retort loan), expenditure on mains, services, meters, and cookers; and after deduction of these items, there remains a surplus of £5625—an increase of £1772.

TRADE NOTES.

Messrs. Robert Dempster & Sons, Ltd., have recently secured the order from the Stretford Gas-Works for 25 settings of ten's silica built-up through retorts 22 ft. long, with a telpher installation including coal grab, wagon tippers, and coke screening plant. The firm have also in hand at the present time the building of a new retort bench consisting of 6 beds of ten's silica retorts, and a telpher plant at the Chesterfield Gas-Works; a new retort bench consisting of 5 beds of eight's built-up siliceous retorts at the Scarborough Gas-Works; a retort bench consisting of 4 beds of eight's silica built-up retorts at the Grantham Gas Works; and in addition they are resetting 20 beds of ten's built-up silica retorts at the Beckton Gas-Works, 3 beds of eight's built-up silica retorts at the Colwyn Bay Gas-Works, and a bed of 8 built-up silica retorts at Ramsgate Gas-Works—making a total of 2½ miles of built-up retorts.

Gas v. Electricity at Tavistock.—The Tavistock Urban Council last week referred back a motion that the tender of the Tavistock Gas Light, Coal, and Coke Company be accepted for five years for lighting all the public lamps for that period. Five councillors voted for the motion and five for amendment that an electric lighting tender be accepted for five years. The Chairman (Mr. W. M. Alger) voted for the gas resolution, but would not use his casting vote. A petition signed by 53 ratepayers was received asking the Council to continue lighting the streets with electricity.

GAS REGULATION ACT.

Castleford and Whitwood Gas Company's Application for an Order.

At the Board of Trade Offices, Whitehall, on June 25, Mr. H. C. Honey (Director of Gas Administration) held an inquiry into an application by the Castleford and Whitwood Gas Company, for an Order under section 10 of the Gas Regulation Act, 1920.

The Castleford Gas Company were represented by Mr. Reginald A. Wilson (Solicitor, Castleford), Mr. Geo. Evetts (Consulting Engineer, Westminster), Mr. G. F. Twigg (Gas Engineer), Mr. H. L. Wilson (Secretary), and Mr. T. Gill (Chairman). The opponents were the Pontefract Rural District Council and the Knottingley Gas Company, represented by Mr. W. Bentley (Solicitor, Pontefract), Mr. G. W. Hobman (Clerk to the Rural Council), Mr. James Smith (Member of the Council), and Mr. E. H. Hudson, Engineer to the Normanton Gas Company, who was called in as adviser; the Aire and Calder Navigation, represented by Mr. Hill (Hill, Vint, and Killock, Solicitors to the Navigation), and the London and North Eastern Railway Company, represented by Mr. H. J. Saunders, of the Chief Legal Adviser's office.

Mr. REGINALD WILSON said the application was for an extension of the area of supply, for a differential price in the extended districts, and for further financial powers. The Company were incorporated in 1872, and obtained an Act in 1878 authorizing them to supply Castleford, Glasshoughton, Whitwood, and other districts. The capital of the Company at that time was £60,000, divided into £30,000 original shares entitled to a 10 p.ct. dividend, and 30,000 7 p.ct. shares. The whole of the capital had been raised, with £16,000 of additional capital; and a total sum of £5012 had been received in premiums. The Company, however, had on very rare occasions paid the dividends which were authorized. For example, in 1912 13, the statutory dividend was 15¾ p.ct. on the additional stock, whereas the dividends actually paid were 14 p.ct. and 11 p.ct. In August, 1922, the Company obtained an Order under the Act of 1920, by which the standard price was fixed at 16 4d. per therm, and the calorific value at 500 B.Th.U. Since that time gas has been sold at 12d. per therm, although for 1923 the Company were unable to pay the statutory dividend. The area was a mining district, and during the past few years progress had not been very rapid with regard to consumption, while the expenditure owing to the extensive use of slot meters had been very heavy. The Company owned three pieces of land near the present works, and now applied for powers to use them for gas manufacture purposes, to which proposal there was no opposition. Powers were also sought to raise £30,000 by the issue of new additional capital with a 7 p.ct. standard dividend, with £10,000 loan, while an increase of the borrowing powers in regard to the old capital from one-quarter to one-third, which would bring in an additional £5000, was also sought. Thus the new capital powers amounted to £49,000, and the estimate of probable expenditure during the next few years amounting to £41,390 had been made, which, added to the existing debit balance, would make up the sum of £45,108. There were no objections with regard to the capital clauses. Another matter dealt with in the draft Order was that the Company should be allowed to calculate their dividends on the half-yearly prices of gas, the effect of which would be to give an additional 5s. p.ct. in dividend, for every increase of one-fifth of a penny per therm in the price of gas. The Aire and Calder Navigation Company had filed certain objections to this proposal, but there had been a settlement, subject to a proviso to be approved by the Board of Trade. At the same time, said Mr. Wilson, he did not wish the proviso to apply to local authorities, unless the Board of Trade wished to have it in, and as a matter of fact no local authority had asked for its insertion.

Mr. HONEY said the point would be considered.

Mr. REGINALD WILSON, continuing, said the London and North Eastern Railway Company's objections were rather complicated. A works clause in the terms of section 43 of the Bridlington Order was asked for, whereas the promoters offered the Barnsley clause affecting the same matter. The Solicitor to the Railway Company had, however, been interviewed, and was likely to agree to certain terms. The arrangement made with the Railway Company was that the promoters of this application would accept the clause as in the Bridlington Order so far as the limits of the new area were concerned, subject to the proviso that the Castleford Company should not be required to incur a double expense in the event of the original work being done to the satisfaction of the Railway Company's Engineer.

Mr. HONEY remarked that this was the general law on the question at the present time.

Mr. REGINALD WILSON said the Railway Company might be in a position to enforce what the promoters wished to avoid. It was possible that they might decide to alter a certain approach to their lines or other works, and if the Gas Company put mains across the approach, to the Railway Company's satisfaction, they (the promoters) might be required afterwards to alter the mains at their own expense. Therefore he asked that the amended Bridlington clause should not be made to apply to the Gas Company's existing limits of supply. Coming to the clause with respect to mains of insufficient capacity, he said he understood that the question was also before a Select Committee of the House of Commons, and he would accept the decision on that point also.

Mr. HONEY said he wished to make it perfectly clear that, though the Board of Trade might be disposed to insert an amended clause if it were agreed to, it must not be assumed that the clause in the form in which it had now been outlined represented the decision of the Board.

Mr. REGINALD WILSON, dealing with a proposal with regard to the Company being authorized to contract for the supply or purchase of gas in bulk, said he understood a similar clause had been inserted in the Pinner draft Order, and the Castleford Directors would be prepared to accept the decision of the Select Committee after it had been fought out. The objections to the draft Order from the Pontefract Rural District Council were then dealt with, the main one being in respect of the proposed differential rate of 2d. per therm for the added

areas, which included an extensive housing scheme now in course of development. At present about 800 houses had been built on the estate, for which the original plans were for 1200 houses. The Gas Company had from time to time received requests for gas from people living on the new housing estate, and within the last few weeks representatives of the Company had visited 82 houses close to their present area, and 61 householders had signed applications for a supply. The demand on the main supplying the 124 houses, according to the views of Mr. Twigg, the Gas Engineer, would absorb its capacity; and if the new area were added, the Company would have to lay a new main on the north side of the estate to supply Fryston, and also to link up the housing estate. As to the proposed differential price, the Directors were satisfied that 2d. per therm for the outlying areas was fair; and he would say at once that if the opposition to this proposal by the Rural Council was carried to a Select Committee, and the promoters could not convince the Committee of the reasonableness of the differential charge, they would have to withdraw that part of the application for the new area, because the Directors could not see their way to go to the expense of a supply unless they were allowed to make the additional charge. He had intimated to the Solicitor to the Rural Council that he would be willing to have a clause for the revision of the differential price at the end of five years from the date of the Order, and that was the full extent to which he was at present prepared to go. There were two other gas undertakings in the district—the Pontefract Corporation, and the Knottingley Gas Company, of which the former did not oppose the Order, and the latter had not raised any objection to the differential price clause. Their only objection to any part of the application affected territory, and they sought protective clauses, though it was assumed they had no desire to supply gas in that particular district. The Castleford Corporation had not lodged any objection, and it might be assumed that they were satisfied that the differential charge of 2d. per therm was reasonable; but if the promoters felt that they could do away with the differential charge, of course the Castleford Corporation might have opposed on the ground that their own consumers were really subsidizing the outer areas. It was a question of the residents in the outer areas getting gas from the Castleford Company or having no gas for a number of years; and on the grounds of public policy he submitted that the Rural Council ought not to have taken any step which would deprive the inhabitants of their own area from obtaining a supply of gas if they required it.

Mr. *George Evetts* stated that some months ago he visited the district, and furnished a report which was the basis of the present draft Order. It seemed to him practically a question of finance from beginning to end, and in looking at the business possibilities of the proposed extension he had come to the conclusion that it would be throwing a burden on the existing portion of the undertaking unless the promoters had power to fix a differential price for the new area. The Company had just placed an order for a new gasholder at a cost of £6500, which was necessary for the present volume of business, and irrespective of the demands of any new area; and if more territory were added, an increase of several millions would ensue.

Mr. Honey said that one difficulty he felt was that the Company were supplying a building estate, comprising 122 houses in the present area, where they were charging a lower price for gas than they proposed to charge to people who were on the building estate in the new limit; and yet at Fryston, which was farther off, though in the present limits, they proposed to charge the lower rate. He realized that the Company had not got to that point yet, but they would supply as soon as they had laid their mains there.

Mr. Reginald Wilson said that in the existing limits of the Company, what was lost on one part was made up on another. That made a sort of flat rate over the whole district, and it would not be fair to ask people in the existing districts to pay more in order to level up the new territory.

Mr. *Gill* said the Company had made up their mind that they would not go into the new area unless on the basis of a differential rate for that part.

Mr. Honey asked whether the people who had sent written requests to be supplied knew that the Company proposed to charge 2d. per therm more than they were charging the rest of the estate.

Mr. Reginald Wilson said that a few people in the proposed new area were already using the Company's gas and paying the 2d. per therm differential rate, and they had not made any complaint as to price.

Mr. Honey asked whether it would not be possible to deal with the new building estate and Fryston as one scheme, and give the consumers a uniform differential price at something less than 2d. per therm. He thought the parties might make an effort to agree on some kind of differential rate in this way. The Rural District Council had rather put itself out of court, because practically it was trying to shut gas out from one portion of the estate, or at any rate making it very much more difficult for the Gas Company to act.

A consultation then took place, and Mr. Reginald Wilson, for the promoters said they had come to an agreement on certain points. They had, for example, agreed that the differential price for the added area should be 1·5d. per therm. So far as the slot-meter users were concerned, they were to have the same treatment as the slot-meter consumers in the existing limits, subject to the differential price, and there would be provision for an inquiry by the Board of Trade at the end of five years from the date of the Order, to ascertain whether the original differential price or any differential price was justified.

Mr. Bentley said they had agreed as to other contentious clauses, and the terms of their agreement would be communicated to the Board of Trade.

Mr. Honey expressed his pleasure that the parties had come to an agreement, and the inquiry closed.

At the Ashby-de-la-Zouch Police Court last week, William Pickering, of Measham, was charged with stealing 10s. 7d. from a gas-meter at Measham. He pleaded guilty. Superintendent Dobney said this was the 52nd time the defendant had been before the Court for various offences. The Chairman sentenced defendant to two months' hard labour.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Slump conditions continue to prevail, and there is much idle time in both Durham and Northumberland collieries. Forward business, such as it is, is in the hands of speculators, as the collieries, with their present working costs, cannot take the prices that are offering. German, and even American, shippers are said to be competing heavily on the Continent. At any rate, there is extremely little new trade coming here.

There is insufficient forward gas coal inquiry to test the market, but, for prompt, ordinary qualities are plentifully offered at 19s. to 20s. 6d. f.o.b. Wear Specials quote 23s. 6d., and best qualities 22s. 6d. to 23s. While the latter are fairly firm, at any rate at the lower quotation, for forward contract business, there is no doubt these prices could be discounted for earlier shipment, by those who could put in tonnage to suit colliery positions.

There are, at present, no definite signs of any turning-point in the position. The unforeseen, however, often happens in the coal trade; and it is most certainly a question of waiting for it at the present time.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

There is no apparent improvement in the Yorkshire and Lancashire coal markets this week. House coal has declined further owing to the warmer weather, and buyers are not stocking to any great extent. South Yorkshire hards are about one shilling down compared with last week, and all classes of nuts are plentiful and difficult to sell. Slacks are easy, and for definite business favourable terms can be obtained. There is little inquiry for gas coke; while furnace coke is a little steadier.

Industries are working badly, and no new inquiries are forthcoming; but requests are to hand for reductions on current figures. Gas coals are moving slowly, and are not quite maintaining the anticipated figures. There is a decided slump in export, and no inquiries are to hand from the nearer Continental countries. As a matter of fact, low quotations are reported to have been submitted for various qualities without producing replies.

In view of the approach of the local and August holidays the situation is causing some degree of anxiety to colliery owners; but so far the South Yorkshire pits have worked satisfactorily, while the West Yorkshire concerns, though not doing equally well, have averaged 4½ days per week. In Lancashire, though colliery prices have not changed, the feeling all round is weak. Prices at Hull at the week-end were: Yorkshire, Derby, and Notts large screened steam, f.o.b. Humber ports, 20s. to 21s. Cargo for export, f.o.b. usual shipping ports—best Yorkshire hards, Association, 23s. 9d.; Derby best hards, 23s. 6d. to 25s.; West Yorkshire Hartleys, 22s. to 24s.; South Yorkshire washed doubles, 21s. 6d.; South Yorkshire washed singles, 20s. 9d.; dry doubles, 16s. 6d. to 17s.; South Yorkshire washed smalls, 15s. 9d. to 16s.; Derby slack, 1 in., 14s.; South Yorkshire rough slack, 14s. 6d.; gas coke, 34s.; foundry furnace coke, 24s. 3d. to 24s. 6d.; washed smithy peas, 23s. 6d. to 28s.; washed steam thirds, 20s. 3d.; and South Yorkshire washed trebles, 22s. to 22s. 6d. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

With contracts for gas coal settled for another year, the week's business has been featureless. Stocks at the gas-works are now full, so that as a rule engineers can only take deliveries at the current rate of consumption. Apart from the effects of the season on the lighting load, demand for industrial purposes is slow. Extreme sluggishness still prevails in the market for steam coal and household grades. Much larger allowances than those shown on general lists are offered by merchants to domestic users who are able to buy by the truck load. The orders accruing are insignificant, however. Householders are not to be induced to stock by warnings of the stringency and consequent advance of prices which may be expected later on.

Gas coke is still very firm. Supplies are equal to demand; but some of the big works are not at all anxious to stimulate sales, their own requirements in connection with the manufacture of water gas being considerable. Contract terms are stiff. The grading of prices for blast-furnace coke by analysis does not commend itself as a practical proposition to some of the big contractors. Its application is partial; but a start has been made this month. The idea is that tests should be made by an independent analyst both at the ovens and the furnaces, the scale providing for a variation of 4d. (or in the higher grades 5d.) for every 1 p.ct. of moisture and ash content above the agreed standard. The basis is 20s. 6d.; but smelters say this represents a lower grade of coke than they would use in ordinary circumstances.

Gas-Works Development at Wolstanton.—The Wolstanton Urban District Council last week adopted a recommendation of the Gas Committee that a carburetted water-gas plant of 200,000 c.ft. capacity per day be laid down at a cost of £2647. Mr. W. J. Hassam, Chairman of the Gas Committee, said that most members were aware that the present capacity of the gas-works was much below requirements. For many years they had had the question of extension under consideration, and the Committee had now decided to recommend the installation of a water-gas plant. With that object in view, the sum of about £2000 had been placed on one side from revenue. For three or four years they had been having a supply from Newcastle, but, while the arrangement had been satisfactory, he thought Newcastle could not supply gas as cheaply as they could make it themselves. The scheme was unanimously adopted, and the tender of Messrs. Humphreys and Glasgow, Ltd., of London, was accepted.

STOCK MARKET REPORT.

CONTRARY to expectation the Bank rate remained unchanged on Thursday last. This led to a better feeling, and prices tended to improve slightly. The prevailing impression of dearer money in the near future, however, is indicated in both the financial and stock markets. The Stock Exchange would, of course, prefer the rate to be raised at once rather than have the possibility hanging over markets from week to week. In spite of the more confident tone at the end of the week, business in most sections remained on a limited scale.

A dull tone prevailed in the Foreign Market, and French Government loans again fell away on the further decline of the franc.

In the Industrial Market there was some support for Textile issues; but Engineering and Iron and Steel shares were mostly easier. Oils were well supported, but the announcement of a 5s. per ton reduction in bunker fuel oil will probably bring about a reaction.

New issues continue in favour; and the high yield on the 7½ p.ct. Hungarian Loan at 88 evidently attracted investors, as it is reported the issue was subscribed about twice over.

In the Gas Market, Imperial Continental Gas Association capital stock was again prominent, and the quotation rose 10 points on the week to 160-165. The rise is probably due to the announcement in Parliament that a fourth dividend of 7s. 6d. is to be paid on the award of the Mixed Arbitral Tribunal which will doubtless be followed by an early distribution by the Association. Transactions were numerous, and it will be seen that a number of ordinary stocks showed improvements in quotations.

The following transactions were recorded during the week:

On Monday, Brentford "A" 102, 102½, 5 p.ct. preference 91, 4 p.ct. debenture 77, Commercial 3½ p.ct. 93, 3 p.ct. debenture 58⅜, European 6⅜, Gas Light and Coke 91¾, 92, 92⅛, 92¼, 3½ p.ct. maximum 64½, 4 p.ct. preference 81½, 82, 82½, 3 p.ct. debenture 62, Hong Kong and China 16⅝, 16 11/16, Imperial Continental 153½, Primitiva 6s. 6d., South Metropolitan 99, 99¼, 100, Tottenham "B" 101¾. Supplementary prices, Hong Kong and China 5 p.ct. mortgage debenture 90, Uxbridge 5 p.ct. consolidated 96½.

On Tuesday, Aldershot "C" 82, Alliance and Dublin 64 13/16, Brentford 4 p.ct. debenture 78, 78½, Cape Town 4½ p.ct. debenture 74 *ex* div., Continental Union 28⅛, Gas Light and Coke, 91½, 92¼, 3 p.ct. debenture 62, Imperial Continental 152½, 153½, 153⅜, 154, Primitiva 6s. 6d., 7s. 3d., South Metropolitan 3 p.ct. debenture 61½, Swansea 6½ p.ct. debenture 103 *ex* div. Supplementary prices, Colombo 7 p.ct. preference 10 5/16, 10¼.

On Wednesday, Alliance and Dublin 63½, Bombay £5 7s., £5 8s., Bournemouth "B" 12 11/16, Commercial 4 p.ct. 92½, Continental Union 27, European 6⅜, Gas Light and Coke 91½, 92, 92¼, 3½ p.ct. maximum 64, 3 p.ct. debenture 61⅜, 63, Imperial Continental 153½, 154, 154½, 155, Montevideo 55, South Metropolitan 98⅜, 100, South Suburban 5 p.ct. debenture 96 *ex* div., Tottenham "B" 102½. Supplementary prices, Pinner 6 p.ct. preference 5/16, Wandsworth 3½ p.ct. new 99½.

On Thursday, Bombay 5¼, Bournemouth 6 p.ct. preference £11 0s. 9d., 11⅝, Brentford 4 p.ct. debenture 77, British 118½, Commercial 4 p.ct. 94½, Gas Light and Coke 91, 91½, 91¾, 4 p.ct. preference 82, Hastings and St. Leonards 3½ p.ct. 79½, Imperial Continental 155½, 156, 158½, 159½, 160, 161, Lea Bridge 97½, Liverpool 7 p.ct. preference 104½, 105½, Primitiva 6s. 6d., South Metropolitan 99⅛, 99½, 6½ p.ct. debenture 102½, 103 *ex* div. Supplementary prices, Southgate 10 p.ct. maximum 143½, 7 p.ct. maximum 103½, Uxbridge 5 p.ct. consolidated 95.

On Friday, Alliance and Dublin 65, Bournemouth 6 p.ct. preference 11½, Brentford "A" 102, "B" 101½, 6 p.ct. Richmond debenture 101½, Continental Union 27, European 6 3/32, 6 3/4, 7¼, Gas Light and Coke 91½, 3½ p.ct. maximum 64¼, 4 p.ct. preference 81, 81½, Hastings and St. Leonards 3½ p.ct. 79½, Imperial Continental 163, 164, 165, 165½, Liverpool 7 p.ct. preference 105½, Plymouth and Stonehouse 112½ *ex* div., Primitiva 6s. 3d., 6s. 7½d., South Metropolitan 99½, 99⅜, 6½ p.ct. debenture 104½, Tottenham "B" 101½, 102⅜, 4 p.ct. debenture 77½, Wandsworth "C" 98½. Supplementary prices, Barnet "A" 151, Colonial Gas Association 16s. 6d.

The natural outcome of the recent rise in market discount rates, due to the anticipation of dearer money, was illustrated by the rise of 3s. 8d. in the average rate at which Treasury Bills were sold. In Lombard Street, however, in spite of the repayment of a further large sum due at the Bank, funds were still abundant, and money was obtainable at as low as 1 p.ct.

At the end of the week the Foreign Exchange Market was quiet. French francs continued weak, and, after rising to 85.50, finally closed at 85.35. Belgian and Italian currencies also weakened; the former closing at 96⅝, and the latter at 101 5/16. Sterling, which has been steady throughout the week, finished slightly stronger at 4.33.

The market in silver was inactive; the cash price being 34½d. per oz.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 8, 1922. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. July 4.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
131,978	Stk.	Feb. 7	5	5	Aldershot 5 p.c. max. C.	81—84	..	82
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	70—73	..	..
1,551,868	,,	Apr. 3	5½	6	Alliance & Dublin Ord.	63—68	..	63½—65
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb.	60—65	..	..
280,000	5	May 22	8	8	Bombay, Ltd.	5—5½	..	5⅛—£5/8
100,000	10	Mar. 6	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
383,110	10	,,	7	7	Do. B 7 p.c..	12—13	..	12 1/16
150,000	10	,,	6	6	Do. Pref. 6 p.c..	11—12	..	£11/0/9—11⅛
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb..	54—59*	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb..	74—79*	..	..
992,045	,,	Feb. 21	6 1/16	6 1/16	Brentford A Con.	100—105	+2	102—102½
990,500	,,	,,	6¼	6¼	Do. B New	100—103	+2	101½
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	89—94	..	91
306,690	,,	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	77—78½
181,337	,,	,,	—	6	Do. 6 p.c.Rich.Red.Deb.	100—105	+2	101½
214,740	,,	Mar. 6	11	11½	Brighton & Hove Orig.	170—175	..	..
244,200	,,	,,	8	8½	Do. A Ord.	125—128	..	..
1,287,500	,,	Feb. 21	5	5	Bristol 5 p.c. max.	92—93a	..	..
855,000	,,	Mar. 20	—	7	British Ord.	117—122	..	118½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	118—123*	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77*	..	..
100,000	10	May 22	6	8	Cape Town, Ltd.	6½—7½	..	..
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb..	7:—76*	..	74
626,860	,,	Feb. 21	6	6	Cardiff Con. Ord.	99—102	..	..
237,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	102—107*	..	..
157,150	,,	Mar. 6	5	6	Chester 5 p.c. Ord.	88—93b	..	..
1,513,280	,,	,,	6	6	Commercial 4 p.c. Cap.	90—95	..	92½—94½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	90—95	..	93
475,000	,,	June 12	3	3	Do. 3 p.c. Deb.	56—59	..	58½
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	27—32	..	27—28½
200,000	,,	June 12	7	7	Do. 7 p.c. Pref.	75—80	..	..
660,000	,,	Mar. 6	6½	6½	Croydon sliding scale	101—104	..	..
284,975	,,	,,	5	5	Do. max. div.	84—87	..	..
492,270	,,	Feb. 21	3	4½	Derby Con.	108—110c	..	..
55,000	,,	Jan. 12	4	4	Do. Deb.	74—76c	..	..
209,000	,,	Apr. 3	5	5	East Hull 5 p.c. max.	..	..	..
1,002,180	10	Jan. 24	5	2	European, Ltd.	6½—7½	..	6 3/32—7½
16,503,045	Stk.	Feb. 7	5½	5½	Gas Light & Coke 4 p.c. Ord.	91—93	..	91—92½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	62—65	..	64—64½
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	80—83	..	81—82½
4,761,930	,,	June 12	3	3	Do. 3 p.c. Con. Deb.	61—64	+1	61½—63
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 20	6½	6½	Hastings & St. L. 5 p.c. Conv.	91—96	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	79½—79¾
70,000	10	May 8	10	10	Hongkong & China, Ltd.	16—17	..	16½—16 13/16
86,600	Stk.	Mar. 6	9½	10	Hornsey 7 p.c.	143—148	..	..
1,976,000	,,	May 22	10	30	Imperial Continental Cap.	160—165	+10	152½—165½
263,950	,,	Feb. 7	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 6	6½	6½	Lea Bridge 5 p.c. Ord..	97—102	+2	97½
2,127,340	,,	Feb. 21	5½	5½	Liverpool 5 p.c. Ord.	91½—92½b	..	..
600,000	,,	Mar. 20	7	7	Do. 7 p.c. Red. Pref.	103—106b	..	104½—105½
165,736	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap.	124—129	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb..	53—58*	..	..
75,000	5	,,	5	7	Malta & Mediterranean	3½—3¾*	..	..
541,920	Stk.	June 12	4	4	Montevideo, Ltd.	52—57	..	55
1,875,892	,,	Mar. 6	4¾	5½	Newcastle & Gateshead Con.	85½—85½d	..	85½
250,166	,,	,,	4	4	Do. 4 p.c. Pref..	75—77d	..	..
329,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	70—72*d	..	..
15,000	10	Mar. 6	11	11	North Middlesex 10 p.c.	16—17	..	..
75,940	10	,,	7 7/16	7 7/16	Do. 7 p.c.	11½—11¾	..	..
300,000	Stk.	May 8	9	7	Oriental, Ltd.	98—101	..	..
138,120	,,	June 26	7¼	7½	Plym'th & Ston'house 5 p.c.	112—117*	..	112½
60,000	50	Mar. 6	13	13	Portsea Island B	102—105	..	..
100,000	50	,,	12	12	Do. C	98—103	..	..
2,289,909	1	—	—	—	Primitiva Ord.	¼—⅜	−1/16	6/3—7/3
341,400	100	June 2	4	4	Do. 4 p.c. Red. Deb..	69—74	..	..
600,000	Stk.	Jan. 24	4	4	Do. 4 p.c. Red. Deb. 1911	54—57	..	..
220,335	,,	June 26	4	4	Do. B. Aires 4 p.c. Rd. Db.	54—57*	..	..
321,670	,,	,,	4	4	Do. R'r F'te 4 p.c. Rd. Db.	54—57*	..	..
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref.	6½—7	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	38—40*	−1	..
270,000	Stk.	Mar. 20	5	5 5/8 4	Sheffield A	100—101e	..	..
419,968	,,	,,	5	5 5/8 4	Do. B	100—101e	..	..
1,047,000	,,	,,	5	5 5/8 4	Do. C	99—101e	..	..
90,000	10	June 12	6	8	South African	7—9	..	..
6,609,895	Stk.	Feb 21	5	6½	South Met. Ord.	98½—100½	..	98½—100
102,580	,,	Jan. 10	5	5	Do. Red Pref.	98—100	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	59—62	..	61½
734,000	,,	Mar. 6	6½	6½	Do. 6½ p.c. Red.Deb.	103—105	..	102½—104½
91,500	,,	,,	8½	8½	South Shields Con.	136—138d	..	..
1,087,795	,,	Feb. 21	6	6½	South Suburban Ord. 5 p.c.	101—106	..	..
368,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—98*	..	96
647,740	,,	May 8	6	5	South'mpt'n Ord. 5 p.c. max.	85—88	+1	..
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	73—78*	..	..
250,000	,,	Mar. 6	7	7	Swansea 7 p.c. Red. Pref.	104—106	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	+1	103
120,000	,,	Feb. 21	8	8	Tottenham District A 5 p.c.	119—124	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	101—104	+1	101½—102½
181,255	,,	June 12	4	4	Do. 4 p.c. Deb.	76—80	..	77½
258,251	,,	Mar. 20	5	7/14/4	Tynemouth Con. and New	87—89d	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Mar. 6	9	9½	Wandsworth A 5 p.c.	132—137	..	..
255,636	,,	,,	7½	7½	Do. B 3½ p.c.	110—115	..	..
108,075	,,	,,	6 5/16	6/7/9	Do. C	96—101	..	98½
240,865	,,	,,	6 5/16	6/7/9	New Ordinary	..	..	99½
352,000	,,	,,	7½	7½	Wimbledon 5 p.c.	108—113	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	115—120	..	..
88,416	,,	June 26	3	3	3 p.c. Deb.	55—60*	..	..

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham *d.*—Newcastle. *e.*—Sheffield. * Ex. div.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate of Ammonia.

London, *July 7.*

Markets are very quiet in all products, and prices are nominal; pitch being called about 60s. per ton, and creosote about 7¾d. per gallon. Other products are without change.

Tar Products in the Provinces.

July 7.

The market for tar products still continues very quiet. Pitch sales are reported at slightly lower figures. The market for creosote continues weak, and little or no business is reported. Crude carbolic is steady.

The average values for gas-works products during last week were: Gas-works coal tar, 48s. to 53s. Pitch, East Coast, 58s. to 60s. 6d. f.o.b. West Coast—Manchester, 54s. to 56s. 6d.; Liverpool, 55s. to 57s.; Clyde, 56s. to 58s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 7d. to 7¼d.; salty, 6d. to 6¼d.; Scotland, 6d. to 6¼d. Heavy oils, in bulk, North, 9d. to 9¼d. Carbolic acid, 60 p.ct., 1s. 10d. to 1s. 11d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Fire at Sheffield Cathedral.—Last week a serious fire occurred in Sheffield Cathedral, but fortunately it was discovered at an early stage, and the smart work of the fire brigade averted what, at one time, looked like being a disaster. The motor room was gutted, and the vestry adjoining partly burned out. The organ also suffered injury. The cause of the outbreak is supposed to be the fusing of an electric wire.

The Blackburn Town Council, on July 3, approved an estimate of £920 for a Kirke waste-heat boiler at the Greenbank Gas-Works.

The Cefn Council have accepted the terms of the local Gas Company to light 166 lamps in their area at a cost of 48s. 4d. per lamp, which is a saving of 3s. 4d. per lamp.

At Eckington on Friday last, Ernest Barker, of Beighton, was charged with stealing £1 5s. 2d., the property of the Beighton Gas Company. The Bench fined defendant £3.

No objection is being raised by the Dronfield Urban Council to the application of the Sheffield Gas Company for an Order to take over the Dronfield Gas Light and Coke Company.

The annual inspection of the various works of the Accrington and District Gas Board took place on July 2, when members visited the gas-works in Hyndburn Road, and the Great Harwood Gas-Works.

The Thorne Gas Company have accepted the offer of the Parish Council to light the streets during the coming winter at a cost of 58s. 6d per lamp. A rate of 6d. in the pound will be levied to meet the expense of street lighting.

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areas, which included an extensive housing scheme now in course of development. At present about 800 houses had been built on the estate, for which the original plans were for 1200 houses. The Gas Company had from time to time received requests for gas from people living on the new housing estate, and within the last few weeks representatives of the Company had visited 82 houses close to their present area, and 61 householders had signed applications for a supply. The demand on the main supplying the 124 houses, according to the views of Mr. Twigg, the Gas Engineer, would absorb its capacity; and if the new area were added, the Company would have to lay a new main on the north side of the estate to supply Fryston, and also to link up the housing estate. As to the proposed differential price, the Directors were satisfied that 2d. per therm for the outlying areas was fair; and he would say at once that if the opposition to this proposal by the Rural Council was carried to a Select Committee, and the promoters could not convince the Committee of the reasonableness of the differential charge, they would have to withdraw that part of the application for the new area, because the Directors could not see their way to go to the expense of a supply unless they were allowed to make the additional charge. He had intimated to the Solicitor to the Rural Council that he would be willing to have a clause for the revision of the differential price at the end of five years from the date of the Order, and that was the full extent to which he was at present prepared to go. There were two other gas undertakings in the district—the Pontefract Corporation, and the Knottingley Gas Company, of which the former did not oppose the Order, and the latter had not raised any objection to the differential price clause. Their only objection to any part of the application affected territory, and they sought protective clauses, though it was assumed they had no desire to supply gas in that particular district. The Castleford Corporation had not lodged any objection, and it might be assumed that they were satisfied that the differential charge of 2d. per therm was reasonable; but if the promoters felt that they could do away with the differential charge, of course the Castleford Corporation might have opposed on the ground that their own consumers were really subsidizing the outer areas. It was a question of the residents in the outer areas getting gas from the Castleford Company or having no gas for a number of years; and on the grounds of public policy he submitted that the Rural Council ought not to have taken any step which would deprive the inhabitants of their own area from obtaining a supply of gas if they required it.

Mr. *George Evetts* stated that some months ago he visited the district, and furnished a report which was the basis of the present draft Order. It seemed to him practically a question of finance from beginning to end, and in looking at the business possibilities of the proposed extension he had come to the conclusion that it would be throwing a burden on the existing portion of the undertaking unless the promoters had power to fix a differential price for the new area. The Company had just placed an order for a new gasholder at a cost of £6500, which was necessary for the present volume of business, and irrespective of the demands of any new area; and if more territory were added, an increase of several millions would ensue.

Mr. Honey said that one difficulty he felt was that the Company were supplying a building estate, comprising 122 houses in the present area, where they were charging a lower price for gas than they proposed to charge to people who were on the building estate in the new limit; and yet at Fryston, which was farther off, though in the present limits, they proposed to charge the lower rate. He realized that the Company had not got to that point yet, but they would supply as soon as they had laid their mains there.

Mr. Reginald Wilson said that in the existing limits of the Company, what was lost on one part was made up on another. That made a sort of flat rate over the whole district, and it would not be fair to ask people in the existing districts to pay more in order to level up the new territory.

Mr. *Gill* said the Company had made up their mind that they would not go into the new area unless on the basis of a differential rate for that part.

Mr. Honey asked whether the people who had sent written requests to be supplied knew that the Company proposed to charge 2d. per therm more than they were charging the rest of the estate.

Mr. Reginald Wilson said that a few people in the proposed new area were already using the Company's gas and paying the 2d. per therm differential rate, and they had not made any complaint as to price.

Mr. Honey asked whether it would not be possible to deal with the new building estate and Fryston as one scheme, and give the consumers a uniform differential price at something less than 2d. per therm. He thought the parties might make an effort to agree on some kind of differential rate in this way. The Rural District Council had rather put itself out of court, because practically it was trying to shut gas out from one portion of the estate, or at any rate making it very much more difficult for the Gas Company to act.

A consultation then took place, and Mr. Reginald Wilson, for the promoters said they had come to an agreement on certain points. They had, for example, agreed that the differential price for the added area should be 1·5d. per therm. So far as the slot-meter users were concerned, they were to have the same treatment as the slot-meter consumers in the existing limits, subject to the differential price, and there would be provision for an inquiry by the Board of Trade at the end of five years from the date of the Order, to ascertain whether the original differential price or any differential price was justified.

Mr. Bentley said they had agreed as to other contentious clauses, and the terms of their agreement would be communicated to the Board of Trade.

Mr. Honey expressed his pleasure that the parties had come to an agreement, and the inquiry closed.

At the Ashby-de-la-Zouch Police Court last week, William Pickering, of Measham, was charged with stealing 10s. 7d. from a gas-meter at Measham. He pleaded guilty. Superintendent Dobney said this was the 52nd time the defendant had been before the Court for various offences. The Chairman sentenced defendant to two months' hard labour.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Slump conditions continue to prevail, and there is much idle time in both Durham and Northumberland collieries. Forward business, such as it is, is in the hands of speculators, as the collieries, with their present working costs, cannot take the prices that are offering. German, and even American, shippers are said to be competing heavily on the Continent. At any rate, there is extremely little new trade coming here.

There is insufficient forward gas coal inquiry to test the market, but, for prompt, ordinary qualities are plentifully offered at 19s. to 20s. 6d. f.o.b. Wear Specials quote 23s. 6d., and best qualities 22s. 6d. to 23s. While the latter are fairly firm, at any rate at the lower quotation, for forward contract business, there is no doubt these prices could be discounted for earlier shipment, by those who could put in tonnage to suit colliery positions.

There are, at present, no definite signs of any turning-point in the position. The unforeseen, however, often happens in the coal trade; and it is most certainly a question of waiting for it at the present time.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

There is no apparent improvement in the Yorkshire and Lancashire coal markets this week. House coal has declined further owing to the warmer weather, and buyers are not stocking to any great extent. South Yorkshire hards are about one shilling down compared with last week, and all classes of nuts are plentiful and difficult to sell. Slacks are easy, and for definite business favourable terms can be obtained. There is little inquiry for gas coke; while furnace coke is a little steadier.

Industries are working badly, and no new inquiries are forthcoming; but requests are to hand for reductions on current figures. Gas coals are moving slowly, and are not quite maintaining the anticipated figures. There is a decided slump in export, and no inquiries are to hand from the nearer Continental countries. As a matter of fact, low quotations are reported to have been submitted for various qualities without producing replies.

In view of the approach of the local and August holidays the situation is causing some degree of anxiety to colliery owners; but so far the South Yorkshire pits have worked satisfactorily, while the West Yorkshire concerns, though not doing equally well, have averaged 4½ days per week. In Lancashire, though colliery prices have not changed, the feeling all round is weak. Prices at Hull at the week-end were: Yorkshire, Derby, and Notts large screened steam, f.o.b. Humber ports, 20s. to 21s. Cargo for export, f.o.b. usual shipping ports—best Yorkshire hards, Association, 23s. 9d.; Derby best hards, 23s. 6d. to 25s.; West Yorkshire Hartleys, 22s. to 24s.; South Yorkshire washed doubles, 21s. 6d.; South Yorkshire washed singles, 20s. 9d.; dry doubles, 16s. 6d. to 17s.; South Yorkshire washed smalls, 15s. 9d. to 16s.; Derby slack, 1 in., 14s.; South Yorkshire rough slack, 14s. 6d.; gas coke, 34s.; foundry furnace coke, 24s. 3d. to 24s. 6d.; washed smithy peas, 23s. 6d. to 28s.; washed steam thirds, 20s. 3d.; and South Yorkshire washed trebles, 22s. to 22s. 6d. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

With contracts for gas coal settled for another year, the week's business has been featureless. Stocks at the gas-works are now full, so that as a rule engineers can only take deliveries at the current rate of consumption. Apart from the effects of the season on the lighting load, demand for industrial purposes is slow. Extreme sluggishness still prevails in the market for steam coal and household grades. Much larger allowances than those shown on general lists are offered by merchants to domestic users who are able to buy by the truck load. The orders accruing are insignificant, however. Householders are not to be induced to stock by warnings of the stringency and consequent advance of prices which may be expected later on.

Gas coke is still very firm. Supplies are equal to demand; but some of the big works are not at all anxious to stimulate sales, their own requirements in connection with the manufacture of water gas being considerable. Contract terms are stiff. The grading of prices for blast-furnace coke by analysis does not commend itself as a practical proposition to some of the big contractors. Its application is partial; but a start has been made this month. The idea is that tests should be made by an independent analyst both at the ovens and the furnaces, the scale providing for a variation of 4d. (or in the higher grades 5d.) for every 1 p.ct. of moisture and ash content above the agreed standard. The basis is 20s. 6d.; but smelters say this represents a lower grade of coke than they would use in ordinary circumstances.

Gas-Works Development at Wolstanton.—The Wolstanton Urban District Council last week adopted a recommendation of the Gas Committee that a carburetted water-gas plant of 200,000 c.ft. capacity per day be laid down at a cost of £2647. Mr. W. J. Hassam, Chairman of the Gas Committee, said that most members were aware that the present capacity of the gas-works was much below requirements. For many years they had had the question of extension under consideration, and the Committee had now decided to recommend the installation of a water-gas plant. With that object in view, the sum of about £2000 had been placed on one side from revenue. For three or four years they had been having a supply from Newcastle, but, while the arrangement had been satisfactory, he thought Newcastle could not supply gas as cheaply as they could make it themselves. The scheme was unanimously adopted, and the tender of Messrs. Humphreys and Glasgow, Ltd., of London, was accepted.

STOCK MARKET REPORT.

CONTRARY to expectation the Bank rate remained unchanged on Thursday last. This led to a better feeling, and prices tended to improve slightly. The prevailing impression of dearer money in the near future, however, is indicated in both the financial and stock markets. The Stock Exchange would, of course, prefer the rate to be raised at once rather than have the possibility hanging over markets from week to week. In spite of the more confident tone at the end of the week, business in most sections remained on a limited scale.

A dull tone prevailed in the Foreign Market, and French Government loans again fell away on the further decline of the franc.

In the Industrial Market there was some support for Textile issues; but Engineering and Iron and Steel shares were mostly easier Oils were well supported, but the announcement of a 5s. per ton reduction in bunker fuel oil will probably bring about a reaction.

New issues continue in favour; and the high yield on the 7½ p.ct. Hungarian Loan at 88 evidently attracted investors, as it is reported the issue was subscribed about twice over.

In the Gas Market, Imperial Continental Gas Association capital stock was again prominent, and the quotation rose 10 points on the week to 160-165. The rise is probably due to the announcement in Parliament that a fourth dividend of 7s. 6d. is to be paid on the award of the Mixed Arbitral Tribunal which will doubtless be followed by an early distribution by the Association. Transactions were numerous, and it will be seen that a number of ordinary stocks showed improvements in quotations.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. July 4.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
131,978	Stk.	Feb. 7	5	5	Aldershot 5 p.c. max. C.	81—84	..	82
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	70—73	..	..
1,551,868	,,	Apr. 3	5½	6	Alliance & Dublin Cons.	63—68	..	63½—63
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb.	60—65	..	..
280,000	5	May 22	8	8	Bombay, Ltd.	5—5½	..	5½—£5/8
100,000	10	Mar. 6	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
583,110	10	,,	7	7	Do. B 7 p.c..	12—13	..	12 13/16
150,000	10	,,	6	6	Do. Pref. 6 p.c..	11—12	..	£11/0/9—11½
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb..	54—59*	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb..	74—79*	..	..
992,045	,,	Feb. 21	6 3/10	6 3/10	Brentford A Con.	100—103	+2	102—102½
990,500	,,	,,	6¾	6½	Do. B New	100—103	+2	101½
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	89—94	..	91
306,690	,,	June 12	4	4	Do. 4 p.c. Deb.	75—80	..	77—78½
181,337	,,	,,	—	6	Do. 6 p.c. Rich. Red. Deb.	100—105	+2	101½
214,740	,,	Mar. 6	11	11½	Brighton & Hove Orig.	170—175	..	..
244,200	,,	,,	8	8½	Do. A Ord.	125—128	..	..
1,287,500	,,	Feb. 21	5	5	Bristol 5 p.c. max.	92—93a	..	..
855,000	,,	Mar. 20	—	7	British Ord.	117—122	..	118½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	118—123*	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77*	..	..
100,000	10	May 22	6	8	Cape Town, Ltd.	6½—7½	..	..
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb.	7:—76*	..	74
626,860	,,	Feb. 21	6	6	Cardiff Con. Ord.	99—102	..	..
237,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	102—107*	..	..
157,150	,,	Mar. 6	5	6½	Chester 5 p.c. Ord.	88—93b	..	..
1,513,280	,,	,,	6	6	Commercial 4 p.c. Cap.	90—95	..	92½—94½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	90—95	..	93
475,000	,,	June 12	3	3	Do. 3 p.c. Deb.	56—59	..	58½
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	27—32	..	27—28½
200,000	,,	June 12	7	7	Do. 7 p.c. Pref.	75—80	..	..
660,000	,,	Mar. 6	6½	6½	Croydon sliding scale	101—104	..	..
284,975	,,	,,	5	5	Do. max. div.	84—87	..	..
492,270	,,	Feb. 21	3	4½	Derby Con.	108—110c	..	..
55,000	,,	Jan. 12	4	4	Do. Deb.	74—76c	..	..
209,000	,,	Apr. 3	5	5	East Hull 5 p.c. max.	..	..	..
1,002,180	10	Jan. 24	5	2	European, Ltd.	6½—7½	..	6 25/32—7½
16,503,045	Stk.	Feb. 7	5½	5½	Gas Light & Coke 4 p.c. Ord.	91—93	..	91—92½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	62—65	..	64—64½
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	80—83	..	81—82½
4,761,930	,,	June 12	3	3	Do. 3 p.c. Con. Deb.	61—64	+1	61½—63
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 20	6½	6½	Hastings & St. L. 5 p.c. Conv.	91—96	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	79½—79½
70,000	10	May 8	10	10	Hongkong & China, Ltd.	16—17	..	16½—16 13/16
86,600	Stk.	Mar. 6	9½	10	Hornsey 7 p.c.	143—148	..	..
1,976,000	,,	May 22	10	30	Imperial Continental Cap.	160—165	+10	152½—165½
263,950	,,	Feb. 7	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	..	..
235,242	,,	Mar. 6	6½	6½	Lea Bridge 5 p.c. Ord.	97—102	+2	97½
2,127,340	,,	Feb. 21	5½	5½	Liverpool 5 p.c. Ord.	91¼—92¼b	..	..
600,000	,,	Mar. 20	7	7	Do. 7 p.c. Red. Pref.	103—106b	..	104½—105½
165,736	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap.	124—129	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb.	53—58*	..	..
75,000	5	,,	5	7	Malta & Mediterranean	3½—3¾*	..	..
541,920	Stk.	June 12	4	4	Montevideo, Ltd.	52—57	..	55
1,875,892	,,	Mar. 6	4¾	5½	Newcastle & Gateshead Con.	85½—85½d	..	85½
250,166	,,	,,	4	4	Do. 4 p.c. Pref.	75—77d	..	..
529,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	70—72*d	..	..
15,000	10	Mar. 6	11	11	North Middlesex 10 p.c.	16—17	..	..
75,940	10	,,	7 7/10	7 7/10	Do. 7 p.c.	11½—11¾	..	..
300,000	Stk.	May 8	9	7	Oriental, Ltd.	98—101	..	..
138,120	,,	June 26	7¾	7½	Plym'th & Ston'house 5 p.c.	112—117*	..	112½
60,000	50	Mar. 6	13	13	Portsea Island B	102—105	..	..
100,000	50	,,	12	12	Do. C	98—103	..	..
2,289,909	1	—	—	—	Primitiva Ord.	½—¾	−1/16	6/3—7/3
341,400	100	June 2	4	4	Do. 4 p.c. Red. Deb.	69—74	..	..
600,000	Stk.	Jan. 24	4	4	Do. 4 p.c. Red. Deb. 1911	54—57	..	..
220,335	,,	June 26	4	4	Do. B. Aires 4 p.c. Rd. Db.	54—57*	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	54—57*	..	..
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref.	6½—7	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	38—40*	−1	..
270,000	Stk.	Mar. 20	5	5/8/4	Sheffield A	100—101c	..	..
419,968	,,	,,	5	5/8/4	Do. B	100—101c	..	..
1,047,000	,,	,,	5	5/8/4	Do. C	99—101c	..	..
90,000	10	June 12	6	8	South African	7—9	..	..
6,609,895	Stk.	Feb 21	5	6½	South Met. Ord.	98½—100½	..	98½—100
102,580	,,	Jan. 10	5	5	Do. Red Pref.	98—100	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	59—62	..	61½
734,000	,,	Mar. 6	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	..	102½—104½
91,500	,,	,,	8½	8½	South Shields Con.	136—138d	..	..
1,087,795	,,	Feb. 21	6	6½	South Suburban Ord. 5 p.c.	101—106	..	..
368,837	,,	June 26	5	5	Do. 5 p.c. Deb.	93—98*	..	96
647,740	,,	May 8	6	5	South'mpt'n Ord. 5 p.c. max.	85—88	+1	..
121,275	,,	June 26	4	4	Do. 4 p.c. Deb.	73—78*	..	..
250,000	,,	Mar. 6	7	7	Swansea 7 p.c. Red. Pref.	104—106	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	+1	103
120,000	,,	Feb. 21	8	8	Tottenham District A 5 p.c.	119—124	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	101—104	+1	101½—102½
181,255	,,	June 12	4	4	Do. 4 p.c. Deb.	76—80	..	77½
258,251	,,	Mar. 20	5	7/14/4	Tynemouth Con. and New	87—89d	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Mar. 6	9	9½	Wandsworth A 5 p.c.	133—137	..	..
255,636	,,	,,	7½	7½	Do. B 3½ p.c.t.	110—115	..	..
108,075	,,	,,	6 13/16	6/7/9	Do. C	96—101	..	98½
240,865	,,	,,	6 13/16	6/7/9	New Ordinary.	..	..	99½
352,000	,,	,,	7½	7½	Wimbledon 5 p.c.	108—113	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	113—120	..	..
88,416	,,	June 26	3	3	3 p.c. Deb.	55—60*	..	..

Quotations at:—*a*.—Bristol. *b*.—Liverpool. *c*.—Nottingham *d*.—Newcastle. *e*.—Sheffield. * Ex. div.

The following transactions were recorded during the week:

On Monday, Brentford "A" 102, 102½, 5 p.ct. preference 91, 4 p.ct. debenture 77, Commercial 3½ p.ct. 93, 3 p.ct. debenture 58¾, European 6¾, Gas Light and Coke 91⅞, 92, 92⅛, 92¼, 3½ p.ct. maximum 64½, 4 p.ct. preference 81½, 82, 82½, 3 p.ct. debenture 62, Hong Kong and China 16⅞, 16 15/16, Imperial Continental 153½, Primitiva 6s. 6d., South Metropolitan 99, 99½, 100, Tottenham "B" 101¾. Supplementary prices, Hong Kong and China 5 p.ct. mortgage debenture 90, Uxbridge 5 p.ct. consolidated 96½.

On Tuesday, Aldershot "C" 82, Alliance and Dublin 64 13/16, Brentford 4 p.ct. debenture 78, 78½, Cape Town 4½ p.ct. debenture 74 *ex* div., Continental Union 28½, Gas Light and Coke, 91½, 92½, 3 p.ct. debenture 62, Imperial Continental 152½, 153½, 153⅞, 154, Primitiva 6s. 6d., 7s. 3d., South Metropolitan 3 p.ct. debenture 61½, Swansea 6½ p.ct. debenture 103 *ex* div. Supplementary prices, Colombo 7 p.ct. preference 10 9/16, 10¼.

On Wednesday, Alliance and Dublin 63½, Bombay £5 7s., £5 8s., Bournemouth "B" 12 11/16, Commercial 4 p.ct. 92½, Continental Union 27, European 6¾, Gas Light and Coke 91½, 92, 92⅛, 3½ p.ct. maximum 64, 3 p.ct. debenture 61¾, 63, Imperial Continental 153½, 154, 154⅛, 155, Montevideo 55, South Metropolitan 98½, 100, South Suburban 5 p.ct. debenture 96 *ex* div., Tottenham "B" 102½. Supplementary prices, Pinner 6 p.ct. preference 5 5/16, Wandsworth 3½ p.ct. new 99½.

On Thursday, Bombay 5¼, Bournemouth 6 p.ct. preference £11 0s. 9d., 11 5/8, Brentford 4 p.ct. debenture 77, British 118½, Commercial 4 p.ct. 94½, Gas Light and Coke 91, 91½, 91¾, 4 p.ct. preference 82, Hastings and St. Leonards 3½ p.ct. 79½, Imperial Continental 155½, 156, 158½, 159½, 160, 161, Lea Bridge 97½, Liverpool 7 p.ct. preference 104½, 105½, Primitiva 6s. 6d., South Metropolitan 99⅝, 99½, 6½ p.ct. debenture 102½, 103 *ex* div. Supplementary prices, Southgate 10 p.ct. maximum 143½, 7 p.ct. maximum 103½, Uxbridge 5 p.ct. consolidated 95.

On Friday, Alliance and Dublin 65, Bournemouth 6 p.ct. preference 11½, Brentford "A" 102, "B" 101½, 6 p.ct. Richmond debenture 101½, Continental Union 27, European 6 3/32, 6¾, 7¼, Gas Light and Coke 91½, 3½ p.ct. maximum 64½, 4 p.ct. preference 81, 81½, Hastings and St. Leonards 3½ p.ct. 79½, Imperial Continental 163, 164, 165, 165½, Liverpool 7 p.ct. preference 105½, Plymouth and Stonehouse 112½ *ex* div., Primitiva 6s. 3d., 6s. 7½d., South Metropolitan 99½, 99⅜, 6½ p.ct. debenture 104½, Tottenham "B" 101½, 102⅜, 4 p.ct. debenture 77½, Wandsworth "C" 98½. Supplementary prices, Barnet "A" 151, Colonial Gas Association 16s. 6d.

The natural outcome of the recent rise in market discount rates, due to the anticipation of dearer money, was illustrated by the rise of 3s. 8d. in the average rate at which Treasury Bills were sold. In Lombard Street, however, in spite of the repayment of a further large sum due at the Bank, funds were still abundant, and money was obtainable at as low as 1 p.ct.

At the end of the week the Foreign Exchange Market was quiet. French francs continued weak, and, after rising to 85.50, finally closed at 85.35. Belgian and Italian currencies also weakened; the former closing at 96½, and the latter at 101 9/16. Sterling, which has been steady throughout the week, finished slightly stronger at 4.33.

The market in silver was inactive; the cash price being 34½d. per oz.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5, 1923. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate of Ammonia.

LONDON, *July 7.*

Markets are very quiet in all products, and prices are nominal; pitch being called about 60s. per ton, and creosote about 7¾d. per gallon. Other products are without change.

Tar Products in the Provinces.

July 7.

The market for tar products still continues very quiet. Pitch sales are reported at slightly lower figures. The market for creosote continues weak, and little or no business is reported. Crude carbolic is steady.

The average values for gas-works products during last week were: Gas-works coal tar, 48s. to 53s. Pitch, East Coast, 58s. to 60s. 6d. f.o.b. West Coast—Manchester, 54s. to 56s. 6d.; Liverpool, 55s. to 57s.; Clyde, 56s. to 58s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 7d. to 7¼d.; salty, 6d. to 6¼d.; Scotland, 6d. to 6¼d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 1s. 10d. to 1s. 11d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Fire at Sheffield Cathedral.—Last week a serious fire occurred in Sheffield Cathedral, but fortunately it was discovered at an early stage, and the smart work of the fire brigade averted what, at one time, looked like being a disaster. The motor room was gutted, and the vestry adjoining partly burned out. The organ also suffered injury. The cause of the outbreak is supposed to be the fusing of an electric wire.

The Blackburn Town Council, on July 3, approved an estimate of £920 for a Kirke waste-heat boiler at the Greenbank Gas-Works.

The Cefn Council have accepted the terms of the local Gas Company to light 166 lamps in their area at a cost of 48s. 4d. per lamp, which is a saving of 3s. 4d. per lamp.

At Eckington on Friday last, Ernest Barker, of Beighton, was charged with stealing £1 5s. 2d., the property of the Beighton Gas Company. The Bench fined defendant £3.

No objection is being raised by the Dronfield Urban Council to the application of the Sheffield Gas Company for an Order to take over the Dronfield Gas Light and Coke Company.

The annual inspection of the various works of the Accrington and District Gas Board took place on July 2, when members visited the gas-works in Hyndburn Road, and the Great Harwood Gas-Works.

The Thorne Gas Company have accepted the offer of the Parish Council to light the streets during the coming winter at a cost of 58s. 6d per lamp. A rate of 6d. in the pound will be levied to meet the expense of street lighting.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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